IPP 12-201

AUSTEN BioInnovation INSTITUTE IN AKRON

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
IPP2012@development.ohio.gov

Subject: 2012 OTF IPP LOI

Dear Sir or Madam:

Please accept this Letter of Intent from Austen BioInnovation Institute in Akron for our Ohio Third Frontier Innovation Platform Program (OTF IPP) proposal. The relevant information about our proposal is as follows:

Lead Applicant Name:	Austen BioInnovation Institute of Akron Medical Device Development Center 1 South Main Street, Suite 601 Akron, OH 44308
Contact Person:	Brian L. Davis, Ph.D. Director, Medical Device Development Center (330) 572-7547 bdavis@abiakron.org
Proposed Project Title:	Movement Optimization during Voluntary Exercise (MOVE)
Funds Requested:	~$3,000,000
Known Collaborators:	Parker Hannifin Corporation Orchard Kinetics
Technology Subject Matter:	Technology related to rehabilitation engineering

Project Description
This project brings together an advanced instrumentation platform for biomechanical research and product development with an Ohio-based team that offers tremendous depth in biomechanics, translational R&D, clinical expertise and commercialization success. Movement Optimization during Voluntary Exercise (MOVE) is focused on (i) inventing, developing and commercializing advanced products to serve the societally important, large, and rapidly growing market for rehabilitation products, and (ii) creating high-paying jobs in Ohio.

This market that MOVE addresses is defined as those patients with impaired mobility/ability who cannot perform activities of daily living and who therefore require rehabilitative intervention. This patient population includes individuals with cardiovascular (stroke, peripheral vascular disease), neurodegenerative (Parkinson's disease, multiple sclerosis), metabolic (diabetes) and musculoskeletal diseases (arthritis, etc.) sufficiently severe that they impair mobility/ability to function in daily living.

As the US population ages over the next 25 years, this market is expected to continue to grow at an accelerated rate, bringing an increasing number of these patients, and an increasing need for cost-effective solutions that can restore mobility/ability to function.

Sincerely,

Brian L. Davis, Ph.D
VP, Medical Device Development Center

IPP 12-202

AUSTEN BioInnovation INSTITUTE IN AKRON

Stephen D. Fening, Ph.D.
Director, Orthopaedic Devices
Medical Device Development Center

December 19, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
IPP2012@development.ohio.gov

Subject: 2012 OTF IPP LOI

Dear Sir or Madam:

Please accept this Letter of Intent from Austen BioInnovation Institute in Akron for our Ohio Third Frontier Innovation Platform Program (OTF IPP) proposal. The relevant information about our proposal is as follows:

Lead Applicant Name:	Austen BioInnovation Institute of Akron 1 South Main Street, Suite 401 Akron, OH 44308
Contact Person:	Stephen D. Fening, Ph.D. Director, Orthopaedic Devices (330) 572-7544 sfening@abiakron.org
Proposed Project Title:	Platform for Accelerated Prototyping of Advanced Medical Technology
Estimated Funds Requested:	~$3,000,000
Known Collaborators:	Acro Tool & Die Lubrizol Corporation Ohio Willow Wood
Technology Subject Matter:	Medical Technology related to surgical instruments/equipment, implant devices, and regenerative medicine.

Sincerely,

SDF

Stephen D. Fening, Ph.D.

Enclosure

Summary of Proposed Project:

Musculoskeletal disease is a leading cause of disability in Ohio and across United States. It accounts for over 50% of all chronic conditions for people over 50 years of age. The economic impact is staggering, with an estimated cost of $849 billion in the U.S. (7.7% of gross domestic product) for treatment and lost wages. The human toll in terms of diminished quality of life is immeasurable. Still, the investment in musculoskeletal innovation lags behind other chronic conditions.

In the United States, chronic wounds affect 6.5 million patients. It is estimated that greater than $25 billion is spent annually on the treatment these chronic wounds. Acute wounds occur at nearly each of the nearly 40 million inpatient and 38 million outpatient surgical procedures. Surgical site infections occur in up to 10% of these surgical procedures. As is also the case with musculoskeletal disease, the market for chronic and acute wound healing is projected to increase exponentially in the near term.

The purpose of the proposed Platform for Accelerated Prototyping of Advanced Medical Technology is to improve the treatment of musculoskeletal disease and wound care through the commercialization of advanced medical devices. This partnership will focus on (i) the design of advanced biomaterials and medical devices, (ii) rapidly reducing designs to practice in a state-of-the art device prototyping facility, and (iii) continuous ideation sessions involving industry leaders in Ohio in collaboration with key opinion leaders from hospitals and universities.

IPP 12-203

LETTER OF INTENT For 2012 Ohio Third Frontier Innovation Platform Program
December 21, 2011

Lead Applicant: Case Western Reserve University, 10900 Euclid Avenue, Cleveland, Ohio, 44106

Contact Person: Dr. Wen H. Ko, Professor Emeritus, EECS Department, Case School of Engineering, CWRU. Room 715 B, Glennan Building; Phone: 216-368-4081, e mail:<whk@case.edu>.

Project Title: Non-Hermetic Micropackage Technology for Medical MEMS Devices--- Implantable, Indwelling and Taped–on Monitoring and stimulation Devices

State Funding Requested: $500,000. For two years.

Project Summary:

This project is based on our three years research experience on developing a micro-package platform technology for implantable MEMS systems designed specifically for chronic monitoring or stimulation of body functions. Our The project aim is to develop tools and machines to commercialize this unique, novel, non-hermetic, low-profile packaging technology to address the most significant technical bottleneck inhibiting the clinical implementation of implantable devices and systems developed in research institutions worldwide. Our packaging technology will impact such diverse areas as: neural interfacing, cardiac care, urinary pressure monitoring and control, continuous infusion of drugs, mobile monitoring of patients, as well as the implants used in animals for pharmaceutical drug development and medical research of chronic diseases.

The non-hermetic micropackage technology was developed from three theories derived from over 40 years of observation in the laboratory of Dr. Ko on failures and success of implantable and taped-on medical monitoring devices. Guided by these theories, Dr. Ko and research teams at CWRU recently performed a three and half year experimental study to verified the theories and demonstrated that electronic circuits on PCB test boards and protected with only 0.5 mm-thick flexible biocompatible materials can survive 2 to 10 years in a body temperature saline bath. Animal implant experiment is being prepared for 2012 to implant packaged operating telemetry units in 30 or more animals for months to demonstrate the biocompatibility of the package [1-3]. This effort is being funded by a NIH R21 grant recently awarded to Prof. Ko.

When this project is funded, CWRU will work with the collaborating companies to design tools and quality insurance test procedures to commercialize the non-hermetic micropackage technology as a service to research community and other medical device manufacturers or lease the patent and technology to large implant system companies with fees. We expect a worldwide market for this packaging approach. . However the main office of the company would be in Cleveland Ohio.

Significance: This project will develop a novel approach to packaging biomedical microsystems. The major outcomes are: (a) A nonhermetic package for long lifetime with a lower cost and shorter turn-around time than conventional packages. (b) A technology that offers a miniaturized, light-weight, ultra-thin (less than mm) package with small package volume much smaller than conventional hermetic box packages. (c) A technology that can readily accommodate flexible wires and electrode arrays with the similar thin flexible protective coatings (d) A technology where he outer layer of the package can be soft, smooth and compatible with tissues mechanically and biochemically, thus reducing the potential irritation during body movements or under local pressure.

References.

1. W.H. Ko, M.R. Neuman, K.Y. Lin, "Body Reaction of Implant Packaging Materials", *Biomaterials* **10**, 55-65 (1969).
2. W.H. Ko, T.M. Spear, "Packaging Materials and Techniques for Implantable Instruments", *IEEE Eng. Med. And Biol. Magazine* **2**, 22-38 (1983).
3. W.H. Ko, "Packaging of Micro-fabricated Devices and Systems", *Materials Chemistry and Physics* **42**, 169-175 (1995).
4. L.P. Bu, P. Cong, H.-I. Kuo, X.S. Ye, W.H. Ko, "Micro Package of Short Term Wireless Implantable Microfabricated Systems", *Proc. of IEEE Eng. Med. Biol. Soc. Annual Conf.* **31**, 6395- 6399, Minneapolis, MN (2009).

IPP 12-204

UDRI
UNIVERSITY of DAYTON RESEARCH INSTITUTE

21 December 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

SUBJECT: Letter of Intent for 2012 Ohio Third Frontier Innovation Platform Program – Advanced Materials

Dear Sir or Madam:

The University of Dayton Research Institute (UDRI), a division of the University of Dayton, is pleased to submit this letter of intent for the 2012 Ohio Third Frontier Innovation Platform Program in the area of Advanced Materials.

Lead Applicant: The University of Dayton
300 College Park
Dayton, OH 45469-0104

Administrative Contact: Claudette M. Groeber
Director, Contracts and Grants/Auth. Rep.
(937) 229-2919
claudette.groeber@udri.udayton.edu

Technical Contact: Brian P. Rice, Division Head
Multi-Scale Composites & Polymers
(937) 229-2519
brian.rice@udri.udayton.edu

Project Title: Advanced Materials for Additive Manufacturing Maturation

Estimated Grant Funds to be Requested: $3,000,000

Collaborators: PolyOne, GE Aviation, ATK, RP+M, Bastech, Stratasys, AFRL, NASA Glenn, PolymerOhio, and Honda R&D Americas

UNIVERSITY
OF DAYTON
RESEARCH
INSTITUTE

Contracts and Grants
Administration
300 College Park
Dayton, OH 45469-0104
(937) 229-2919
FAX (937) 229-2291

Project Summary: Additive manufacturing technology has advanced as an enabler for rapid innovation in a broad spectrum of industries including aerospace, energy, medical, and consumer products. Optimization of advanced materials for use in a spectrum of additive processes is critical to ensure this technology reaches its full potential. Collaborators have been selected to build an Ohio supply chain network serving the functions of: formulation of nano-enhanced polymer feedstocks, processing science, product design-certification-production, and work force development.

UDRI looks forward to participating in this program to promote technology-based economic development within Ohio.

Sincerely,

John E. Leland, P.E., Ph.D.
Director, Research Institute

jel:adw

IPP 12-205

EWI
We Manufacture Innovation

1250 Arthur E. Adams Drive, Columbus, Ohio 43221
614.688.5000 • ewi.org

Via Email: IPP2012@development.ohio.gov

December 21, 2011

Ohio Department of Development
Technology and Innovation Division
Attention: IPP
77 South High Street, 25th Floor
Columbus, OH 43215

Innovation Platform Program "2012 IPP LOI"

Ladies and Gentlemen:

EWI is pleased to submit its Letter of Intent to submit a proposal in response to the 2012 Innovation Platform Program RFP and accompanying Summary Statement.

Proposed Project Title: Expanding EWI's Innovation Platform for Aeropropulsion Manufacturing and Repair

Lead Applicant: EWI
1250 Arthur E Adams Drive
Columbus, Ohio 43221
614.688.5000
www.ewi.org

Contact person: Mr. Chris Conrardy
VP and Chief Technology Officer
Tel: 614.688.5191
Email: cconrardy@ewi.org

Estimated State Funds to be Requested: $3M

Known Collaborators: GE Aviation (Evendale, OH); Morris Technologies (Cincinnati, OH); RQM (Cincinnati, OH); Goodrich Aerospace (Brecksville, OH)

Thank you for your consideration.

Best regards,

Chris Conrardy
VP and Chief Technology Officer

Summary- Expanding EWI's Innovation Platform for Aeropropulsion Manufacturing and Repair

Advanced manufacturing technologies will continue to have dramatic impacts on aeropropulsion system cost, performance, and service life, thereby impacting competitiveness of Ohio manufacturers and component suppliers. Emerging additive manufacturing and repair technologies have the potential to transform the ways in which aircraft engine components are produced and maintained. Implementation of key emerging technologies will enable more efficient and cost-competitive engine designs, with fewer components, fewer assembly operations, and less material waste. New repair technologies will allow engines to safely operate longer, enhancing life-cycle cost. Producing more competitive products will create job growth in Ohio aeropropulsion supply chains.

EWI has an established Innovation Platform for aeropropulsion additive manufacturing and repair leveraging many advanced manufacturing technologies. This platform incorporates unique technology capabilities and strengths, talent, equipment, facilities, engaged industry partners, intellectual property, and a track record of research commercialization and innovation. EWI uses these platform technologies to develop innovative, world-class, confidential solutions for aerospace clients to provide our clients a competitive advantage. In fact, aeropropulsion manufacturing and repair is EWI's single most important commercial sector, exceeding all others in both sales and growth in 2011.

EWI proposes to expand its existing Innovation Platform with new capabilities that will benefit commercial purposes in the short-term and contribute to the sustainability and industrial relevance and use of the Innovation Platform in the long-term. EWI proposes to invest in two disruptive manufacturing technologies in the technical field of additive manufacturing and repair to allow Ohio suppliers to create and support new engine platforms that improve performance and reduce component cost. Adding these disruptive technologies to EWI's Innovation Platform will position EWI as a global leader in aeropropulsion additive manufacturing and repair for many years to come.

EWI will partner with GE Aviation and their Ohio suppliers on the proposed program. EWI will also involve Ohio members of the Additive Manufacturing Consortium, which EWI leads to catalyze collaborations in technology commercialization, innovation, and product development with industry and technology providers. Funding from the Innovation Platform Program funding will be used to acquire two state-of-the art manufacturing technologies to expand EWI's existing Innovation Platform. EWI and industry partner funding will be used to test, refine, and develop Innovation Platform technologies for client-specific applications. GE Aviation has targeted critical rotating component repair in support of GE's new GENX engine in the 2014 timeframe. Additionally, a particular part that will require over 20,000 pieces per year, starting in 2016, has been identified that represents one of a family of parts that will provide even greater opportunities in the long-term. The impact of this technology to GE Aviation is increased engine sales via unparalleled fuel consumption, saving commercial airlines over a billion dollars per year as the next generation engines enter into service in 2016. Many of these engines will be assembled or partially assembled in the Cincinnati, Ohio plant and rely on parts produced by Ohio suppliers.

IPP 12-206

THE OHIO STATE UNIVERSITY

Prospective Applicant's Name: The Ohio State University

Applicant's Legal Structure: The Ohio State University

Organization's Address: ECE dept., 2015 Neil Ave. Columbus, OH 43210

Contact Person: Ali Keyhani

Phone Number: 614-353-4691 Cell

Email Address: keyhani@ece.osu.edu

Expected Collaborators: Emerson/Liebert, American Electric Power, and EMTEC

Proposal Type: Innovation Platform Program

Project Title: Center for Control Distributed Renewable Energy in Smart Grids and Critical Power Sites

Estimate Grant Requested: $3,000,000.

Summary: The Ohio State University (OSU) applied green energy control Laboratory has developed an innovation platform for distributed energy integration. The OSU green energy laboratory has been collaborating with industry as part of the Ohio State University College of Engineering Center of Sustainability. In this proposal, this platform will be used for penetration of renewable sources in microgrids for critical power sites, industrial and commercial microgrids, and microgrids of residential users. Bottlenecks for increasing of renewable sources stem from (i) the need to install expensive spinning-reserves; (ii) the resulting wear and tear of thermal units; (iii) the inability to prevent cascaded grid failure. Microgrids of critical power site have high reliability requirements. Solar and wind energy stations now are close to cost parity with fossil based grid power. The integration of critical power loads, distributed renewable energy, and distributed storage systems are required for grid control as assets of smart power grids with the high penetration of intermittent renewable generators. The software control technology modules will be developed by setting up a simulation platform using AEP's real world grid data. The control technology will be tested on a scalable grid model of AEP's system that demonstrates 10%, 20% and 40% penetration of photovoltaic generating stations with distributed energy storage. Models for photovoltaic generating stations, storage systems, and aggregated demand response used as virtual generators will be developed and used in designing the power controls of the microgrids and smart power grids. The software control assets are bidirectional power converters for control of distributed storage, solar-inverter control of active and reactive power, and virtual generators for synchronous and asynchronous operation of smart microgrids and power grids. The innovation platform is used to demonstrate resilient, robust, and affordable power that accommodates effective microgrid control in the presence of highly intermittent renewable sources.

IPP 12-207

December 21, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

Subject: 2012 IPP LOI

Dear Sir or Madam:

Please accept this Letter of Intent from The University of Akron for our Ohio Third Frontier 2012 Innovation Platform Program proposal. The relevant information about this proposal is as follows:

Lead Applicant Name:	College of Engineering The University of Akron Akron, OH 44325-3905
Contact:	Dr. Gary L. Doll (330) 972-7350 gdoll@uakron.edu
Proposed Project Title:	Advanced Surface Treatments
Estimated Funds Requested:	$3,000,000
Known Collaborators:	The Timken Company (Canton, OH) ASB Industries (Akron, OH) MesoCoat Inc. (Euclid, OH)

A summary of the proposed project appears on the following page.

Sincerely,

Kathryn Watkins-Wendell, M.Ed., CRA
Director, Research Services and Sponsored Programs

Office of Research Services and Sponsored Programs
Akron, OH 44325-2102
330-972-7666 • 330-972-6281 Fax

Advanced Surface Treatments Project Summary:

This project shall pursue creative solutions to technological challenges through the development of advanced materials and their commercialization. We propose to exploit the combination of tribology, surface engineering, corrosion engineering, and polymer science expertise that is unique to the University of Akron to create new materials designed to solve difficult technological challenges and launch an advanced technology company to provide these new materials to numerous industries. Specifically, we propose to (1) leverage the recent materials breakthrough made in nanocomposite ceramic coatings for rolling element bearings to improve the tribological performance of other mechanical systems, and (2) model and create solutions to the corrosion processes encountered in the refining, transporting, and exploration of oil and gas.

Based upon an acquired fundamental and technological understanding of the life-limiting wear modes and friction losses in mechanical systems, it is probable that the nanocomposite ceramic coating that we developed which eliminates wear and increases bearing life to values never seen before will also be effective on other steel mechanical components. We plan to evaluate this coating on gears and other components that are used in aerospace mechanical systems like rotorcraft gearboxes, alternative power generation like wind turbines, and biomedical implants.

The total annual cost of corrosion in the oil and gas production industry is estimated to be $1.372 billion, broken down into $589 million in surface pipeline and facility costs, $463 million annually in down-hole tubing expenses, and another $320 million in capital expenditures related to corrosion. We plan to perform *ab initio* quantum mechanical modeling to elucidate the fundamental chemical interactions leading to corrosion of carbon steel tubing, and develop robust ceramic, polymer, or composite solutions that can be applied to the tubing and couplings. Processes will be developed by two of the collaborators to apply these solutions to tubing made by the Timken Company (the world's leading supplier of seamless carbon steel tubing), with eventual prototype systems being field tested by a third collaborator.

The technologies developed will be ready for commercialization in 3-4 years, and will lead to significant job growth in the collaborating companies as well as potential suppliers in the state of Ohio.

Office of Research Services and Sponsored Programs
Akron, OH 44325-2102
330-972-7666 • 330-972-6281 Fax

IPP 12-208

Ohio Third Frontier Innovation Platform Program 2012 Letter of Intent

Lead Applicant: The Ohio State University, Center for Automotive Research and Office of Energy and the Environment, 1960 Kenny Road, Columbus, OH 43210

Proposal Title: Innovation Platform: Distributed Energy Storage Systems

Budget Request (Estimated): $3,000,000

Industry Partners: Beckett Energy Systems, CAR Technologies LLC, Vanner, American Electric Power, Ford, GM.

Contact: Giorgio Rizzoni, Center for Automotive Research – 930 Kinnear Road, Columbus, OH 43212, e-mail: rizzoni.1@osu.edu tel. (614) 688-3856, fax. (614) 688-4111

Fundamental advances in energy storage systems will have an immediate and lasting impact on the transition to a wide range of alternative, renewable energy sources that depend on energy storage to guarantee continuity of power supply (e.g.: solar, wind). The electric power grid can significantly benefit from distributed energy storage, and it is quite likely that the market for stationary energy storage will increase dramatically in the future. Any advances in energy storage systems, including power conversion and fast charging technologies, are also likely to support the commercialization and penetration of electrified vehicles.

This proposal is founded on an existing innovation platform created by the OSU Center for Automotive Research with the support of two OTF WPP investments: the *Center of Excellence for Energy Storage Technology*, and the *CAR Center of Excellence for Electric and Plug-in Vehicle Technology*. The resulting innovation platform provides a unique set of facilities, equipment and engineering capabilities focused on advanced energy storage and vehicle electrification. These facilities include over 130 channels of battery characterization and validation testers, a power electronics converter validation laboratory, full-scale vehicle test facilities, and many other testing facilities and engineering services supported by a technical staff of over 20 people. The Ohio State University is also a designated OBOR Ohio Center of Excellence in both Advanced Energy and in Advanced Transportation and Aerospace – these designations are well aligned with the scope and intent of the innovation platform.

The objective of this proposal is to expand the existing innovation platform to support the commercialization and broader penetration of DESS solutions from our commercial partners, Beckett Energy Systems, CAR Tech, AEP, Vanner, Ford and GM. In particular, we seek to leverage the testing and engineering services provided by the platform to advance the commercialization of a Distributed Energy Storage System (DESS) incubated by Beckett Energy Systems with the following goals:

1. Refine the design of DESS
2. Validation and aging characterization of DESS
3. Develop fast charging solutions that leverage the capabilities of the DESS towards Level III DC charging systems for electric vehicles

The DESS offers the following advantages:

- Energy shifting/ load leveling at the grid edge (closest to the problem source)
- Voltage and power factor correction (closest to where it is needed)
- DESS is modular and expandable in 25kW/25kWh increments
- DESS can be used to reduce "demand spike" energy costs
- DESS provides energy storage for local renewable integration of solar/wind power (ramp, smoothing)
- DESS will "island" from the grid in the event of a grid outage and continue to power downstream loads (similar to a UPS)
- DESS systems can be aggregated to provide larger peak power demands

The innovation platform has already achieved a significant degree of success by engaging multiple companies (Vanner, CAR Technologies, AEP, FirstEnergy, Duke, DP&L, PJM, GM, Ford, Chrysler, Caterpillar, Nissan, Magna) in the commercialization of power conversion systems, grid connected vehicle applications, and battery characterization and validation. Funding will be used to accelerate the commercialization of DESS and of power conversion and fast charging systems. Some of the funds will be specifically dedicated to supporting the use of the existing innovation platform facilities to validate and to contribute to national certification standards in support of commercial product development of these systems.

IPP 12-209

UDRI
UNIVERSITY of DAYTON RESEARCH INSTITUTE

22 December 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

SUBJECT: Letter of Intent for 2012 Ohio Third Frontier Innovation Platform Program – Situational Awareness and Surveillance Systems

Dear Sir or Madam:

The University of Dayton Research Institute (UDRI), a division of the University of Dayton, is pleased to submit this letter of intent for the 2012 Ohio Third Frontier Innovation Platform Program in the area of Situational Awareness and Surveillance Systems. The project summary is attached.

Lead Applicant: The University of Dayton
300 College Park
Dayton, OH 45469-0104

Administrative Contact: Claudette M. Groeber
Director, Contracts and Grants/Auth. Rep.
(937) 229-2919
claudette.groeber@udri.udayton.edu

Technical Contact: Larrell Walters, Division Head, Sensors Systems Division and Director, IDCAST
(937) 239-5717
larrell.walters@udri.udayton.edu

Project Title: Situational Awareness Integration, Visualization, Validation, Exploitation and Demonstration (SAIVVED) Commercialization Platform

Estimated Grant Funds to be Requested: $3,000,000

Collaborators: Persistent Surveillance Systems, Pelican Systems, STAN Solutions, Woolpert, Tiltan Systems, Defense Research Associates, and the City of Dayton

UDRI looks forward to participating in this program to promote technology-based economic development within Ohio.

Sincerely,

John E. Leland, P.E., Ph.D.
Director, Research Institute

jel:adw

UNIVERSITY
OF DAYTON
RESEARCH
INSTITUTE

Contracts and Grants
Administration
300 College Park
Dayton, OH 45469-0104
(937) 229-2919
FAX (937) 229-2291

ATTACHMENT

THE UNIVERSITY OF DAYTON RESEARCH INSTITUTE
LETTER OF INTENT FOR 2012 OHIO THIRD FRONTIER
INNOVATION PLATFORM PROGRAM –
SITUATIONAL AWARENESS AND SURVEILLANCE SYSTEMS

PROJECT SUMMARY

The University of Dayton Research Institute (UDRI) will leverage the resource assembled by the Wright Center of Innovation, IDCAST (Institute for the Development and Commercialization of Advanced Sensor Technology) to produce an end-to-end situational awareness commercialization platform that will be utilized by Ohio companies to validate the viability of their situational awareness products and services in an operational environment.

In today's environment, situational awareness companies have to demonstrate their products, but they also have to demonstrate them as part of an integrated situational awareness system. The official term is Data-to-Decision, meaning that what is desired as the end product is not a specific sensor feed, but instead all the information to make the needed decision in a timely manner.

This program will build upon the substantial space, equipment, and expertise available Ohio companies and universities through the UDRI-led IDCAST, to finalize a commercialization platform that can integrate, validate, visualize, exploit, and demonstrate the value of a company's or university's technology as it applies to situational awareness. This commercialization platform will initially have three projects from different industry teams.

First, will be a wide area airborne situation awareness system, achieve by working in close collaboration with Persistent Surveillance Systems (PSS) of Xenia, Ohio, Pelican Technologies of Dayton, Ohio, City of Dayton Police Department, and UDRI. This project is built around the capabilities of PSS and the commercial viability of their Hawkeye II system. It involves the integration of other sensor and queuing technologies to provide real time situational awareness over areas up to 25 square miles.

Second, will be a wide area UAV/ground-based situational awareness fusion exploitation system. This will be achieved by working with Woolpert of Beavercreek, Ohio, Tiltan Systems of Israel, Defense Research Associates, and UDRI. This project involves fusing live video feeds from UAVs or ground based systems over a GPS accurate model of a wide area such as a city. This allows the covered parts of the city to be viewed almost as if watching a movie all on one screen. Additionally, the 3D model of the areas to be observed will be built automatically in near real time from the same video and picture sources that will be fused to their surfaces. This enables significant command and control enhancements while simplifying the visualization of the situation being observed. This project will also integrate new sensor technology to validate the senor's performance in an integrated command and control system.

The product of these two projects becomes the primary basis of the SAIVVED commercialization platform, providing the ability to integrate and validate situational awareness technologies such as sensors, communication systems, algorithms for exploitation, processing methods, storage technologies, and varying information dissemination methods. Thus creating a dual value for these two projects; completing the final development of two product systems while also becoming the platform for the validation, integration, and commercialization of innovative situational awareness technologies.

Third, will be the development of a high powered W band receiver/transmitter that could revolutionize today's wireless communications. This project will be accomplished by working with STAN Solutions and UDRI. This breakthrough technology is a development at UDRI and enables cost-effective development of high-power (50+ watts) W band receiver/transmitters. This project will utilize the Platform's integration and testing capabilities to demonstrate the technology and then utilize the SAIVVED commercialization platform to validate and demonstrate the bandwidth and range improvements this technology will provide.

The primary objectives of this program are to 1) utilized the existing capabilities and resources of IDCAST to establish a sustainable commercialization platform in situational awareness, 2) finalize and demonstrate ground based and airborne situational awareness systems that have significant market potential, 3) utilize the afore mentioned situational awareness systems as the basis of the sustainable commercialization platform that can serve to integrate, validate, demonstrate technical performance and commercial value of Ohio technologies, and 4) utilize SAIVVED to demonstrate and commercialize ground-breaking high power W-band technology that will revolutionize wireless communications.

IPP 12-210

WRIGHT STATE UNIVERSITY

LOI for OTF Innovation Platform Program FY2012

Date: Thursday, Dec. 22, 2011

Lead Applicant:
John Mackay, Business Development Officer
Wright State University
College of Engineering & Computer Science
3640 Colonel Glenn Highway
Dayton, OH 45435
Office: 937-775-5257
Email: john.mackay@wright.edu

Subject: "2012 IPP LOI"

Submitted To: IPP2012@development.ohio.gov

Project Title: Innovation Platform Based on Knowledge-Based Search Systems

Estimated Grant Funds: $3 million

Known Collaborators: TBD

Project Summary:

Knowledge-based search systems are proposed as an improvement over conventional search and have gained popularity especially given the availability of many expert curated vocabularies and taxonomies in the biomedical domains. The different classes in a given taxonomy are used to provide faceted search over articles that contain the instances of these classes. These taxonomies and other forms of ontologies are mostly static blocks of well accepted consensual knowledge. We believe the search process can benefit from recently published results that are not well known in the research community and also by relationship types that go beyond the taxonomic ones. Scooner is a knowledge-based literature search and exploration system that is built upon this intuition. We are working on providing more powerful knowledge-based search where recently published results are computationally extracted and used a background KB to guide the search process. The key here is that the knowledge-base that guides search is extracted from the same universe of literature that is being explored. Wright State University will work with various Ohio companies to create commercial value from its university-based expertise.

IPP 12-211

The Department of Polymer Science
Goodyear Polymer Center
Akron, OH 44325-3909
(330) 972-8594 Office
(330) 972-5290 Fax

December 19, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street
25th Floor Columbus, OH 43215
IPP2012@development.ohio.gov

Subject: 2012 OTF IPP LOI

Dear Sir or Madam:

Please accept this Letter of Intent from The University of Akron for our Ohio Third Frontier Innovation Platform Program (OTF IPP) proposal. The relevant information about our proposal is as follows:

Lead Applicant Name:	The University of Akron 302 Buchtel Common Akron, OH 44325-2102
Contact Person:	Matthew L. Becker, Ph.D. Department of Polymer Science (330) 972-2834 becker@uakron.edu
Proposed Project Title:	Akron Functional Materials Center
Estimated Funds Requested:	$3,000,000
Known Collaborators:	The University of Akron Austen Bioinnovation Institute in Akron The Lubrizol Corporation Avery Dennison Akron Polymer Systems
Technology Subject Matter:	Combinatorial and High-Throughput Optimization of Material Properties for Acceleration of Polymer-based Innovations

Sincerely,

Matthew L Becker, Ph.D.

Summary of Proposed Project:

The Akron Functional Materials Center (AFMC) is a joint initiative between the College of Polymer Science and Polymer Engineering at the University of Akron and the Austen Bioinnovation Institute in Akron (ABIA). The AFMC will involve industrial researchers in focused projects that are designed to be mutually beneficial. This approach has the benefits of magnifying out research efforts, assuring relevancy, and directly transferring acquired knowledge and techniques to industry. Collectively the combinatorial and high-throughput approach will accelerate the translation of polymer innovations into products.

The AFMC resides in the newly constructed National Polymer Innovation Center; a 42,000 square foot facility designed specifically for advanced materials research, class II bioresearch, characterization, and advanced manufacturing. Academic, government and clinical participants in the AFMC will work with industrial members to address challenges and develop solutions in the areas of human health, energy and sustainability. The AFMC will drive innovation efforts to the next level – by fostering a pre-competitive environment where large numbers of clinicians, corporations, scientists and engineers will define common problems and work in tandem with member partners to provide solutions to these challenges.

IPP 12-212

Lead applicant: The University of Toledo
Daniel Georgiev, Ph.D.
EECS Department, Mail Stop 308
Toledo, OH 43606
Phone: (419) 530-8184
Email: Daniel.Georgiev@utoledo.edu

Other UT principle investigators: M. Deo (EECS Department), V. Devabhaktuni (EECS Department), M. Elahinia (MIME Department), Y. Gan (MIME Department), D. Nims (Civil Engineering), W. Sun (Engineering Tech.), H. Wang (Engineering Tech.), and L. Wang (EECS Department).

Contact person: James P. Trempe, Ph.D.
Vice President, Research
Phone: (419) 530-2844
Email: James.Trempe@utoledo.edu

Project title: ***Wireless Ultrasonic Imaging Network for Structural Health Monitoring***

Estimated funding request: $2,000,000 over a 3-year period.

Collaborators:

1. Craig Near, Genziko Inc., 975 Research Dr., Toledo, OH 43614, 678.558.7540, craig.near@genziko.com
2. Mark Heiferling, Bluetronix Inc., 8401 Chagrin Rd, Suite 5A, Chagrin Falls, OH 44023, 440.247.3434, mheiferling@bluetronix.net

Project Summary

This IPP project is to develop, test, and commercialize a novel wireless ultrasonic imaging network for structural health monitoring (SHM). This SHM system is based on frequency steering which reduces the hundreds of phase array channels to one, making it amenable to wireless imaging of civil, industrial, and aerospace infrastructure to properly determine and prioritize maintenance, repair, or replacement. The project will primarily address the Sensing and Automation Technologies area. However, it will utilize Advanced Materials with nano piezoelectric ceramic materials and meso-scale net shape formation technologies.

The proposed wireless ultrasonic imaging network will support improvements of flight and infrastructure safety and reliability by providing greater, autonomous, and real time fault/failure detection, localization, and characterization, leading to condition based maintenance. The objective is to enable early detection of degradation before full functional failure thereby offering mission and flight planning agents and infrastructure owners some ability to "prognose" a future event allowing data driven decision making for assessing the impact of system failures. In addition, real time SHM data may be integrated with operating parameters for integrated vehicle health monitoring. This objective is accomplished by imaging an acoustic "fingerprint" of a structure, which is monitored for precise localized changes over time, and used to develop historical information.

Successful completion of this program is expected to lead to the commercialization of a range of wireless ultrasonic imaging sensors and vibrational energy harvesters for the civil, industrial, automotive, biomedical, and aerospace markets. This technology will be demonstrated on various aerospace platforms to be provided by Boeing, Wright Patterson and Warren Robbins AFB, and NASA LaRC, KSC, and JSC. In addition to structural health monitoring and leak detection, FSAT is has potential applications in steered sonar and ultrasound systems, ultrasonic flowmeters, and ultrasonic processing. The estimated market for these wireless ultrasonic sensor systems exceeds $10 billion.

IPP 12-213

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

Email: IPP2012@development.ohio.gov

Subject: Ohio Third Frontier
Innovation Platform Program
Request for Proposals; Fiscal Year 2012
Letter of Intent to Apply

December 21, 2011

Dear Sir or Madam:

This is a Letter of Intent to submit a proposal in response to the 2012 RFP from the Ohio Third Frontier, Innovation Platform Program.

Lead Applicant: Cleveland State University
2121 Euclid Avenue
Cleveland, OH 44115-2214

Contact Person: Dr. Orhan Talu
Associate Director, Fenn R&D Institute
Phone: (216) 687-2571
Email: o.talu@csuohio.edu

Project Title: Advanced Control Systems

Estimated State Funds : $ 2,000,000

Collaborators: (at present)
1) Manufacturing Advocacy & Growth Network – MAGNET
1768 East 25th Street, Cleveland, Ohio 44114-4420

2) Unicontrol Inc.
1111 Brookpark Rd., Cleveland, Ohio 44109

Regards,

Attachment: Summary of Proposed Project

Ohio Third Frontier
Innovation Platform Program
Request for Proposal; Fiscal Year 2012
Letter of Intent from Lead Applicant: Cleveland State University

Proposed Project Title: Advanced Control Systems

Summary of Proposed Project

Fenn R&D Institute of Cleveland State University hereby submits this Letter of Intent for a proposal in response to the Ohio Third Frontier Innovation Platform Program (IPP). The proposed project, which falls into the Sensing and Automation Technologies sector (as identified in the IPP RFP) is based on, and an extension of, Advanced Control Technology Platform developed at Fenn College, which itself has an excellent record of technology commercialization.

This project will research and develop commercialization of advanced energy control (AEC) system for use in a wide variety of commercial and industrial processes and machinery. AEC technology focuses on critical components, such as sensors and actuators, and various subsystems, such as temperature loops, pressure loops, water level regulation etc., which are parts of any industrial process that consume or convert a large amount of energy, including production lines of various goods and power generation of various kinds (thermal, wind, nuclear). The control system will have the following features:

- Control algorithms offering improved dynamic response, with less overshoot, than traditional control technologies such as the Proportional, Integral, Derivative (PID) control algorithms currently used in thousands of controllers, programmable logic controllers (PLCs), Distributed Control Systems (DCS), and dedicated machine control systems.
- Various transmitters for monitoring process variables including pressures, temperatures, levels, and flows
- Programmable control system hardware and software including advanced energy control logic
- Operator interface
- Supervisory control and data acquisition interface
- Final process elements interface

Key intent is to stimulate "significant, industry-defined and directed opportunities through the development and commercialization of new products and innovations" in the Sensing and Automation Technology space (RFP p. re: purpose). We have already identified one for-profit company who have committed to project collaboration at this time, Unicontrol Inc. of Cleveland, which has substantial market share in control systems in general and combustion control in particular.

Furthermore, a critical partnership with Manufacturing Advocacy & Growth Network (MAGNET) has been established. MAGNET, a technology based economic development organization whose focus is to facilitate growth of the manufacturing sector, will play a key role in identifying commercial collaborators both during and after the project. Through its knowledge of the needs of small to mid-size manufacturers, its familiarity with advanced controls technology and the benefits that it can bring to market, and through it service offerings, which include product and process development, prototyping, and market research, MAGNET will assist participating companies in commercializing the innovation(s) that results from the use of the advanced controls assets at Fenn College. This collaboration model will lead to a sustainable model for job creation and positive long-term economic impacts in this technology space via continued Innovation Platform activity over the project term, and beyond via identification of post-project partnerships.

IPP 12-214

Ohio Third Frontier Innovation Platform Program Letter of Intent

Lead Applicant: Kent State University, Research & Sponsored Programs, 134 Cartwright Hall, PO Box 5190, Kent, OH 44242-0001,

Contact: Rebecca L. Hayes, Assistant Director – Sponsored Programs, 330-672-0712, rlhayes@kent.edu.

Principal Investigator: Dr. Michael R. Fisch – College of Technology, 330-672-9388, mfisch@kent.edu

Project Title: *Machine-to-Machine Communication for Building Lighting Systems, Medical, and Industrial Applications.*

Estimated state funds Requested: $1,750,000.

Collaborators:

Bluetronix Inc., PO Box 23054, Chagrin Falls, OH 44023, (440) 247-3434, Mark J. Heiferling, President, mheiferling@bluetronix.net

Energy Focus, 32000 Aurora Road, Solon, OH 44139, (800) 327-7877, Laszlo Takacs, Director of R&D, R_D@energyfocusinc.com

Computer Aided Solutions, LLC (d.b.a. CAS DataLoggers), 12628 Chillicothe Rd, Chesterland, OH 44026, (440)-729-2570, Pete Martin, Sales Manager, pmartin@dataloggerinc.com

Summary: The collaborative consisting of: Kent State University (KSU) - College of Technology, Bluetronix Inc., Energy Focus, and Computer Aided Solutions (CAS) LLC is offering an innovative solution that applies a novel virtual ad hoc networking technology to deliver new products to the market that will enable superior control of LED lighting systems, medical product lines, and industrial systems. KSU College of Technology will lead the project, while also focusing primarily on testing and initial demonstration of prototypic, preproduction, and early few-of-a-kind production units as each application is developed from the platform networking technology. Bluetronix will provide the core virtual ad hoc networking technology and will embed its proprietary software into commercial-off-the-shelf (COTS) hardware to support application to each product line as the project proceeds. This proprietary, patented technology is the product of $2+ million in research and development work sponsored by DARPA, US Army, and USAF. Energy Focus provides the lead product line, advanced LED lighting systems, which will be controlled using data derived from sensors networked using the Bluetronix technology. This provides a means to advance the Energy Focus product line by further reducing energy consumption through advanced control strategies. It also positions the collaborative to have a rapid launch in a rapidly growing market. CAS provides the next baseline application in support of an existing medical market that it serves worldwide and thus provides future access to worldwide industrial sensor applications. This unique teaming arrangement provides a base technology platform that the team will build out across multiple market segments: building systems, medical equipment, and industrial systems and thus support rapid growth through worldwide distribution channels.

III. Letter of Intent

Lead Applicant: James Blank, Department of Biological Sciences, Kent State University, Kent, Ohio 44242
Contact Person: James Blank, Jblank@kent.edu
Phone: 330-672-3614
Project Title: VIRTUAL TELEMEDICINE
Estimated State Funds Requested: $1.25 million.
Known Collaborators: Standing Rock Imaging, LLC, Cuyahoga Falls, OH.

Summary of Proposed Project: The goal of this proposal is to complete development of existing hardware and infrastructure for the collaborative and interactive stereoscopic viewing of medical 3D data (CT, MRI, Ultrasound). Leveraging years of research at Kent State in biomedical visualization and the generation of novel patent-pending systems for the interactive visualization of multi-dimensional datasets we intend to provide end-users with hardware and software for viewing and analyzing biomedical datasets. We have a prototype system already developed that can provide physicians, researchers and patients the ability to visualize volumetric data as an interactive visualization exploiting existing and novel. The imaging system will permit the viewing and analyzis of four dimensional data (e.g. A beating heart , MR images of a patient over a year) and co-registered multi-channel data (such as CT/PET and MRI). Stereoscopic volume rendered images of physiological data will provide a more realistic spatial representations of macro and microscopic neural structures. Numerous imaging modalities (including MRI, CT and confocal microscopy) can produce data consisting of sequential images making up a volume of data. Most users still view this data in a 2D environment using intensity based projections and summing the images to generate a single view. When displayed interactively, as an entire volume, far more information can be conveyed, both qualitatively and quantitatively exposing complex structures and interactions found in biological data. The importance of viewing biomedical/biological phenomena in their natural form, as a spatially oriented and interrelated system, rather than as a discontinuous set of independent components is striking. The new viewing systems will provide faster and more accurate interpretation and understanding of patient data and outcomes.

New software applications will be developed working with our partners both commercially and medically to meet requirements and end user utility. We anticipate this group will include existing partners including health care providers located at several Summit County medical institutions as well as local business partners (Standing Rock Imaging, LLC being one). The imaging system will be incorporated into the exisiting imaging infrastructure and pipeline to seemlessly integrate the stereoscopic viewing station into 1) primary care physicians desk, 2) operating rooms and 3) patient viewing stations. This integration will provide an automated data input method to read images from exisiting scanning hardware systems (MR manufacturers, CT manufacturers as well as storage and archiving systems (ie. PACS)). Funding will be used to hire 2 network programmers, 2 image visualization/data analysis programmers, 2 Technicians for training/installation and a medical sales/Liason. The project is planned to begin with systems installed and tested at local area hospitals and clinical facilities. A number of new products will be developed and manufactured by XYZ company that will generate an inexpensive thin client viewing station consisting of a software/hardware solution for interactively viewing archived medical scans in stereoscopic 3D. We also intend to create a statewide anonymous and open source database including anonymized volunteering participants medical imagedata for population analysis, training and research for the Ohio community. Time to market for a complete system is estimated at 8-18 months.

IPP 12-216

Lead Applicant name: Kent State University
Address: 201E Liquid Crystal Institute
Phone Number: 330-672-2070
Contact Person: **Hiroshi Yokoyama**
e-mail address: hyokoyam@kent.edu
Proposed project title: New Concept Devices Based on Nanoscale Engineering of Polymer-Liquid Crystal Interface
Estimated State Funds to be requested: $3,000,000
Known collaborators:

- Kent Displays, Inc.
- Alpha Micron, Inc.
- Akron Polymer Systems, Inc.

Summary of Proposed Project

The Liquid Crystal Institute (LCI) at Kent State University has been a hub of innovation that made possible the current $150B LCD industry. As an internationally recognized center of liquid crystal research, the LCI is committed to creating an innovation platform that efficiently catalyzes the transfer of basic technology to the commercialization of high-performance value-added devices. The strategic significance of liquid crystals in advanced materials is ever growing. Commercial applications of metamaterials require orientational order – a synonym for liquid crystallinity - of the constituent nanoparticles as to fulfill their functional objectives.

Unlike conventional materials, the bulk behavior of liquid crystals is dominated by surface interactions. Current LCD technology is based on glass substrates, however, liquid crystal devices are on the threshold of a new technology: that of flexible plastic substrates, and, more generally, heterogeneous polymer-liquid crystal composites. This emerging technology has the potential to transform not only the display industry, but a wide variety of others as well.

The device goals of the LCI platform range from bio-sensor chips for use in healthcare to high-efficiency organic photovoltaics for solar power applications. The common thread underlying new LC technology is the precise, nanoscale control of liquid crystal interfaces. The proposed vertically integrated team aims to focus on polymer – liquid crystal interfaces, and enhance the predictive power of the existing R&D platform at the LCI by combining state-of-the-art analytical tools with the computational engineering approach. By working closely together with the partner companies, impact on product lines should be almost immediate, making possible products with a radically new design and higher functionality.

Through the design and engineering of polymer-liquid crystal interfaces, this proposal aims at the rapid development and commercialization of new devices, incorporating liquid crystals, ranging from small molecule to nanoparticle assemblies, with far-reaching commercial impact.

IPP 12-217

McKay, Michael J.

From: Gerhardt,Jon Stuart <jgerhar@uakron.edu>
Sent: Saturday, December 24, 2011 7:59 AM
To: OhioThirdFrontierRFP
Subject: 2012 IPP LOI

Lead Applicant Name The University of Akron Jon S. Gerhardt Ph.D., P.E. Design Associate Professor of Mechanical Engineering, Auburn Science and Engineering Center, Akron, Ohio 44325-3903, 330-972-8846, jgerhar@uakron.edu

The title is Enhanced Survivability Run Flat Tires expecting to request $1,000,000. Collaborators from the University include Dr. Wieslaw Binienda, Dr. Xiosheng Gao, and Dr. Greg Morscher. The companies include American Engineering Group (AEG) that has just completed a phase I SBIR for the Army on this topic as well as several other run flat tire projects, A & P Technologies of Cincinnati and Goodyear Tire and Rubber.

The technologies associated with this project include the carbon fiber composite structures that provide the means to support the tire load while no air is in the tire, composite adhesion and construction technologies to provide efficient production of tires and other means to provide damage aversion in hostile environments.

Specifically the system in the tire uses hoops of carbon fiber which will require analysis and optimization of dimensions as well as optimization of binder material to provide strength and fatigue life to the carbon fiber hoops. This technology will be further developed from the protype material by the University of Akron and A & P Technologies. AEG has developed several protypes of the tire system in several sizes for the military and have demonstrated the technology to the Army. During this process several joint patents have been developed. AEG will continue to work to move the prototyes to production including technologies to enhance speed of production as well as improve the uniformity and consistency of the hoops. Goodyear has agreed to work with AEG and the University of Akron to develop production methods and provide manufacturing of the tires.

IPP 12-218

FY 2012 OHIO THIRD FRONTIER INNOVATION PLATFORM PROGRAM

Lead Applicant: The Ohio State University Office of Sponsored Programs, 1960 Kenny Road, Columbus, OH 43210
Proposal Title: Center for Motorsports Technology and Commerce
Budget Request (Estimated): $3,000,000
Collaborators: OSU Center for Automotive Research, CAR Technologies, Arshot Investment Corporation/Cooper Park Redevelopment, Columbus Electric Motorsports, a National Automotive Racing Association, an Advanced Battery OEM, a Major Electric Utility, a Major Vehicle OEM, and others
Contact: Dr. Giorgio Rizzoni, Center for Automotive Research and Mechanical Engineering Department 930 Kinnear Road, Columbus, OH 43212, e-mail: rizzoni.1@osu.edu, tel. (614-688-3856), fax. (614) 688-4111.

The motorsport industry designs, develops and manufactures innovative vehicle engineering solutions and prototypes including chassis, materials, electronics, motors, inverters, engines, transmissions, brakes, telemetry, tires, and suspension components. Motorsport businesses have developed a unique ability to use sporting events and entertainment as a catalyst for engineering and manufacturing advances of significant value to other High Performance Engineering (HPE) customer groups – Aerospace (advanced materials, sensors/controls, and power management), Automotive (advanced materials, sensors/controls, and power management), and Defense (engineering best practice, testing technologies, safety technologies, performance/duty cycle optimization, advanced materials, sensors/controls, and power management).

As the industry begins to transition to all-electric racing, Motorsports still offers one of the purest research and development platforms to help commercialize the true potential of electric power, dynamic energy recovery, lightweight engineered materials, compact powertrains, advanced battery safety and durability, advances in sensors/motor controllers, and more. Ohio's well-developed automotive, aerospace, and defense industry supply chains are in a unique position to benefit from the cross-industry development, transfer, and commercialization of technologies that support the global motorsports industry. At the state level, Ohio is already a major player in Motorsports with racing venues, thousands of race teams (at all competition levels), key suppliers and national promotional sponsors spread across the entire state.

To establish Ohio as the center for high performance engineering for the growing market for vehicle electrification and advanced energy storage solutions for motorsports applications, The Ohio State University, as the lead applicant, is proposing to leverage Ohio's past investments in hybrid and electric powertrain engineering facilities, advanced battery technology testing and engineering infrastructure, and materials joining and advanced energy manufacturing solutions – collectively Ohio's Innovation Platform for Vehicle Electrification and Advanced Energy Storage – and to expand those unique capabilities to focus on safety, durability, and advanced control technologies that will accelerate the commercial adoption of electrified powertrains for the global Motorsports industry – and beyond. This program investment will directly benefit the commercialization activities of a major Ohio motorsports racing venue, an Ohio supplier of electrified racing powertrain and vehicle systems, and a national automotive racing association with over 1,500 members/teams within the State of Ohio – demonstrating the potential for technology commercialization, capital investment and job creation for Ohio within this valuable economic sector.

***** The LOI must be received before December 29th and should be addressed to IPP2012@development.ohio.gov with "2012 IPP LOI" appearing in the subject line *****

IPP 12-219

Mark R. Chance, Ph.D.
Vice Dean for Research

School of Medicine

10900 Euclid Avenue
Cleveland, Ohio 44106-4988

Visitors and Deliveries
BRB 930

Phone 216.368.0291
Fax 216.368.3812
mark.chance@case.edu

SCHOOL OF MEDICINE
CASE WESTERN RESERVE UNIVERSITY

Lead Applicant: Mark R. Chance, PhD
Address: 10900 Euclid Avenue
BRB930
School of Medicine
Case Western Reserve University
Cleveland, OH 44106
Phone: 216-368-4406
Email: mark.chance@case.edu
Contact: Maita Diaz, Assistant to Mark Chance
Contact email: maita.diaz@case.edu

Proposed Project Title: Northeast Ohio Health-IT Innovation Platform
Estimated State Funds Requested: $2,000,000 direct costs
Collaborators: GQ Zhang, PhD
David Kaelber, MD, PhD
Anil Jain, MD
Rod Nibbe, PhD
Debashish Roy, PhD

The Center for Translational Science Collaborative, a consortium of medical institutions in Northeast Ohio led by Case Western Reserve University (CWRU), has developed nationally recognized Health Information Technology (Health-IT) and Bioinformatics Research and Training programs. These programs have produced a number of commercial products and these innovations have helped drive the formation of new companies in Northeast Ohio. This proposal for the Northeast Ohio Health-IT Innovation Platform (NEOHIT) consciously builds on these successes to further commercialize software ideas and platforms. The long-term goals of the proposal are to:

- Expand opportunities for commercializing Health-IT innovations from CTSC affiliated faculty and students to create and grow scalable software companies in Ohio;
- Within three specific projects, increase the technical capabilities of Ohio software companies and elevate business competencies of Ohio entrepreneur partners in the academic units.
- Over time cultivate a highly collaborative and innovative health informatics community and build strong connections to Ohio's community of technology entrepreneurs to develop targeted market driven commercial opportunities in software for health research and health care.

Information technology is a growing business sector in Ohio and during this period of recent Health-IT business growth, Northeast Ohio Medical institutions represented in the CTSC, namely CWRU, the Cleveland Clinic, University Hospitals, and Metro-Health Center, have dramatically expanded their health informatics research and development programs. The CTSC is a $64 million grant from the National Institutes of Health intended to lower barriers to clinical and translational research. Within the CTSC, two cores, Biomedical Research Informatics Management (BRIM) and Translational Technologies and Resources (TTR) have been actively involved in Health Informatics research, development and commercialization. The scientific team providing leadership for these cores have

national reputations in informatics software development and form the basis of the academic team that will lead the proposed Health-IT Innovation Platform. These include Dr, Mark Chance Vice Dean for Research at CWRU School of Medicine and PI of TTR, GQ Zhang Professor of Computer Science and David Kaelber, Professor of Medicine, Co-Directors of BRIM. Each of these faculty will provide the key academic leadership in the development of novel software tools to be commercialized with three Ohio companies in three projects.

1. In a project between CWRU and Explorys, a notable Ohio company that specializes in analyzing clinical data from electronic medical records (EMRs) patient selection and stratification tools will be further developed with novel honest broker approaches along with integration with molecular data from clinical trials. This will extend the Explorys platform and help enhance the Ohio environment to promote clinical trial activity. The co-leaders of the project at CWRU and the company will be Dr. GQ Zhang and Dr. Anil Jain, Chief Scientific Officer at Explorys, respectively.
2. In a project between CWRU and NeoProteomics (Neo), an Ohio Network Biology Company specializing in speeding drug development, novel bioinformatics tools developed by Dr. Chance at CWRU will be protoyped and commercialized at Neo, helping to fill gaps in Neo's software toolkits, and improving the company's offerings to help speed and manage clinical trials. This project will be led by Dr. Chance at CWRU and Dr. Rod Nibbe, Senior Software Developer at Neo.
3. In a project between CWRU and BioInVision, an Ohio company specializing in small animal imaging systems, novel informatics software for core facility management developed by Prof. Zhang will be prototyped in the company, Prof. Zhang will lead the CWRU component and Dr. Debashish Roy will lead the company's effort.

Overall, NEOHIT will establish a platform for moving software rapidly from innovative proof of principle to prototypes to robust commercial software attractive to health industry and Pharma customers worldwide. In addition innovative programs for internships and training will help drive workforce development so Ohio students can move rapidly into the newly created Ohio job opportunities. The academic and commercial partners are well poised to establish and sustain this platform over the long term.

IPP 12-220

CASE WESTERN RESERVE UNIVERSITY EST. 1826
Department of Biomedical Engineering

December 27, 2011

Ohio Third Frontier (OTF) Innovation Platform Program
The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

RE: Letter of Intent for the OTF Innovation Platform Program, Fiscal Year 2012

To Whom It May Concern:

This is a Letter of Intent to submit an Innovation Platform Program proposal to the OTF Program for fiscal year 2012.

Lead Applicant: P. Hunter Peckham, Case Western Reserve University, 10900 Euclid Ave., Cleveland, OH 44106

Contact Information:

P. Hunter Peckham
Case Western Reserve University
Department of Biomedical Engineering
Wickenden Building Rm 116
10900 Euclid Ave.
Cleveland, OH 44106
Email: pxp2@case.edu
Phone: 216-778-3480

Project Title: "Commercialization of an Innovative Neuromodulation and Neurostimulation Technology Platform"

Estimated State Funds to be requested: $3M

Collaborators:

NDI Medical, LLC, 22901 Millcreek Blvd, Cleveland, OH 44122
SPR Therapeutics, LLC, 22901 Millcreek Blvd, Cleveland, OH 44122

Key Relevant Scientific/Technical Fields: Medical Devices, Neuromodulation, Neuroprostheses

Project Summary is attached

Sincerely,

P. Hunter Peckham, Ph.D.
Donnell Institute Professor of Biomedical Engineering
Case Western Reserve University

"Commercialization of an Innovative Neuromodulation and Neurostimulation Technology Platform"

Summary

The goal of the proposed project is to complete the steps necessary to launch commercialization of a new and innovative platform technology for neuromodulation and neurostimulation applications. This new technology, the "Networked Neuroprosthesis" (NNP) system, has been developed at Case Western Reserve University (CWRU) through the work of investigators with significant experience in the development of active implantable medical devices. The NNP System will form the platform technology for systems that treat motor paralysis, spasticity and pain. The technological development of the NNP is now completed and the system is operational. The OTF Innovation Platform Program (IPP) will support the final step necessary to launch this technology, specifically the completion of the necessary manufacturing, regulatory and quality assurance procedures to successfully obtain regulatory approval for use as a Class III Medical Device through the US Food and Drug Administration. CWRU is partnering with NDI Medical, an Ohio-based medical device company with direct experience in the development, manufacturing, regulatory approval, and commercialization of Class III Medical devices. Potential customers are already in line and waiting for products, including a collaborator on this project, SPR Therapeutics. Based on these and other factors, it is expected that this project will result in a new sustainable platform product.

The NNP System is a modular, scalable, and configurable network of fully implanted modules capable of meeting or exceeding the needs of a broad class of neuromodulation and neuroprosthetic applications. Each NNP module contains local processing capabilities and can be programmed through a transcutaneous wireless link. The modules are networked using a single cable that distributes power and provides a data communication link between each module. The NNP System derives its power from an implanted rechargeable power module. The entire implanted system can be reprogrammed using a bi-directional wireless link contained in the power module (MedRadio). This feature of programmability allows the identical hardware components to be utilized in a variety of applications. The configurable networked architecture allows the NNP System to be applied equally well to modest disabilities, using a few components, or severe disabilities, requiring a significant variety of components. This novel architecture also facilitates system expansion, technical upgrades, and functional enhancements. NNP configurations have been envisioned for a wide variety of clinical applications, including providing motor function in spinal cord injury, stroke, and multiple sclerosis, as well as spasticity control and pain relief in a wide range of neurological disorders. The NNP System provides a foundation which enables efficient technical refinements that optimize implementation of the system for each targeted application. The NNP System is both a fundamental breakthrough in the design of active implantable medical devices.

This project builds upon the exemplary activities conducted by these same key partners under previous OTF funding. Through this program, we have directly created over 50 new highly skilled jobs, have generated over 200 new patents and disclosures, and have manufactured and sold over 1,000 neurostimulation product units. This program has successfully completed the state's first major neurostimulation acquisition from the world's market leader, resulting in new investment resources and a formal licensing agreement generating significant future royalty income. Our goal in this proposal is to build on the momentum we have already gained in establishing a profitable Ohio-based growth industry in neurotechnology. We are now poised to repeat the process of commercialization through our innovative platform technology, creating further opportunities for expanding job creation.

IPP 12-221

Letter of Intent

Lead Applicant: The University of Akron
Address: The University of Akron, 302 Buchtel Common, Akron, OH 44325-2102
Phone Number: 330-972-6764 (Office of Research Services and Sponsored Programs)
Contact Person: R. A. Weiss (rweiss@uakron.edu); 330-972-2581

Proposed Project Title: **Development of Novel Membranes for Advanced Energy Storage.**

Estimated State Funds to be Requested: $3,000,000

Collaborators: Ashlawn Energy, Painesville, OH
Akron Polymer Systems, Akron, OH

Project Summary

The U.S. Department of Energy's Office of Electricity has set a goal to increase energy storage capacity 10-fold, primarily to improve grid reliability and facilitate renewable energy generation. It has been estimated that some $600B will be spent on energy storage solutions in the next 10-12 years (*International Flow Battery Forum conference, Vienna, Austria, June 16, 2010*). The objective of this proposal is to develop new membrane technology for improving the performance and economics of vanadium redox flow batteries (VRB). The following key Ohio Third Frontier primary scientific/technical field(s) relevant to the proposed project are: 1) advanced polymeric materials and 2) energy storage.

A vanadium redox flow battery (VRB) stores energy and generates electricity by reduction-oxidation (redox) reactions. This proposal represents a collaboration between the University of Akron (UA), Ashlawn Energy, LLC (Ashlawn) and Akron Polymer Systems (APS) to develop new membrane technology that will produce transformational changes in commercial VRB technology. Ashlawn Energy, LLC, located in Painsville, OH, is a leading redox flow battery designer and manufacturer. Akron Polymer Systems, Akron, OH, specializes in R&D on new high performance polymer materials.

The current state-of-the-art VRB membrane is a perfluorosulfonate polymer, Nafion™, which is manufactured by DuPont (Wilmington, DE). These membranes cost $500 – 750/$m^2$ and a 1 MW cell uses over 1000 m^2 of membrane. The cost of the current membrane comprises about 40% of the cost of the stack. In addition to its high cost, Nafion exhibits high electrical resistance and excessive water swelling, which produces an imbalance of vanadium ions in the cell due to osmotic transport through the membrane. The V-ion transport lowers cell efficiency. Excessive swelling of the membrane also blocks the manifolds and restricts electrolyte flow that also lowers efficiency.

Materials development by the University of Akron (UA) will be directed at new membrane materials with lower water swelling to reduce V-ion transport and improve durability, reducing the electrical resistance of the membrane and improving the sealing of the membrane. UA will work with APS to synthesize new materials and design new membrane morphologies that can replace perfluorosulfonate membranes in a VRB. It is expected that the polymers developed from this research will become a commercial product for APS or be licensed to another material supplier. UA will produce membranes sufficient for demonstration projects by Ashlawn, using the unique features of roll-to-roll film casting platforms, which were built with Wright Center of Innovation funding. Initially, UA will produce 10-inch wide membranes 1 to 6 mils (25 – 150 μm) thick, but the capability exists for producing 24-inch media sufficient for the Ashlawn commercial VRBs. One of these manufacturing platforms, an *electromagnetic processing* machine, can be used to orient specific phases, e.g., functionalized carbon nanotubes, in the normal (through thickness) direction of the membrane to improve membrane performance or durability. The second platform, a *hybrid processing* machine, can embed electrospun nanofibers into the membrane to improve the mechanical properties and electrical conductivity. The membrane technology IP developed by this project can be used to either spin-off a private company that would mass produce membranes or develop a partnership with an existing company with membrane processing capability.

Ashlawn will use the UA-produced membranes to demonstrate the viability of a VRB. The target membrane material cost is ~6% of the stack cost, i.e., ~$30/$m^2$, and a reduction of ion-transport that can produce a 3% efficiency improvement. The ultimate goal of Ashlawn's VRB is a 9¢/kWh battery. The major competition for this technology is Dalian National Laboratory for Clean Energy in Dalian, China, which has developed carbon fiber reinforced membranes and successfully operated a VRB for 10,000 charge-discharge cycles.

IPP 12-222

December 27, 2010

FY 2012 OTF IPP Program
Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

Sub: 2012 IPP LOI

This **Letter of Intent (LOI)** is provided by the University of Toledo in anticipation of a proposal for the FY 2012 Ohio Third Frontier (OTF) Innovation Platform Program (IPP).

1. **Lead Applicant Contact:**
   Dr. Krishna Shenai, Professor
   Electrical Engineering and Computer Science Department
   MS 308, 2801 W. Bancroft Street
   The University of Toledo
   Toledo, OH 43606-3390
   TEL: (419) 530-8144; FAX: (419) 530-8146
   E-MAIL: krishna.shenai@utoledo.edu

2. **Project Title:** Low-Cost Advanced Spinal Surgical Robot

3. **Budget Request Estimate:** $3,000,000 from OTF IPP

4. **Lead Organization and Legal Structure of the Organization:** The University of Toledo is one of the nation's leading research universities.

5. **Collaborating Organizations:** X-spine Systems, Inc., Miamisburg, OH 45342; Toledo Orthopaedic Surgeons, Toledo, OH 43615; Ohio Supercomputer Center, Columbus, OH 43212.

6. **Project Description:**

This project will commercialize our new minimally invasive spinal surgical (MISS) robotic concept [1] integrated with advanced imaging and tracking technologies. The robotic action is controlled in a closed-loop manner using the sensing and feedback signals obtained by real-time modeling of the spine on a high-performance computing platform. The technique employs accurate three-dimensional (3D) finite element (FE) spine modeling as the spine is being displaced or deformed by the robotic action. A prototype of this robotic surgical concept has been built and tested as functional; the system needs further improvement to

be deployed in a surgical environment. In this project, a patient-specific spine model will be developed and integrated into Class II FDA approved robotic system to improve the accuracy of robotic movement; and, the speed of control of the robot will be dramatically improved by reducing data transmission time, by using improved model reconstruction methods, and by using improved markers in order to render this surgical concept practical. An *in situ* spine imaging technology will be integrated in order to provide additional flexibility and greatly enhanced surgical accuracy.

This project brings together diverse yet overlapping interests and expertise of an electrical and computer engineer, an orthopedic biomechanical engineer, a practicing spinal surgeon, and a commercialization entity for exploring new methods to facilitate rapid development of a robust intelligent spinal robotic surgical system. The overall research builds on a cyber platform that integrates (i) advanced imaging and computer modeling; (ii) line-of-sight ultrasonic tracking and position monitoring; and (iii) real-time control and precision-guidance of the robot. The two most important intellectual contributions of the research include a new integrated hardware (*e.g.*, demonstration of a complex, intelligent, adaptive, surgical robotic system) and software (*e.g.*, accurate patient-specific 3D spine modeling using real-time, line-of-sight tracking and imaging of the spine).

With the advent of computing and design tools, it is now possible to integrate high-performance computers in a closed-loop system, perform real-time modeling of complex objects, and remotely navigate robotic systems with high degree of precision. The proposed surgical robotic system has the potential to significantly advance the current state-of-the-art of spinal surgery as it reduces the patient trauma and cost of surgery, and minimizes radiation exposure to the personnel in the surgical operating room. The same concept can be extended to perform other types of surgeries and to increase the efficiency of manufacturing operations and surveillance/detection functions.

[1] B. R. Lilly, K. Shenai, V. Goel and A. Biyani, "Robotic Surgical System Utilizing FE Model Coupled with Ultrasonic Tracking," in *Proceedings of 2010 IEEE International 53rd Midwest Symposium on Circuits and Systems*, Seattle, WA, August 1-4, 2010, pp. 997-1000.

Sincerely,

Krishna Shenai, PhD
Professor
Electrical Engineering and Computer Science Department

IPP 12-223

CASE WESTERN RESERVE UNIVERSITY | INSTITUTE FOR ADVANCED MATERIALS

10900 Euclid Avenue
520 Kent Hale Smith Building
Cleveland, Ohio 44106-7202
(216) 368-0067

January 3, 2012

Dear Ohio Department of Development,

Please accept this Letter of Intent (LOI) from Case Western Reserve University (CWRU) for participation in the Third Frontier Innovation Platform Program.

Lead Applicant's Name:	Case Western Reserve University (CWRU)
Address:	Institute for Advanced Materials (IAM@Case) 10900 Euclid Avenue 520 Kent Hale Smith Building Cleveland, Ohio 44106
Telephone:	(216) 368-0067
Contact Person:	James Pae
Contact Email:	james.pae@case.edu
Proposed Project Title:	Creation and Use of Molecular Rebar for New Technologies and Company Development
Estimated Grant Funds to be Requested:	$3 Million
Known Collaborators:	Designed Nanotubes, Ricerca Biosciences, NFM Welding Engineers, Styron

Project Summary

There has been a great deal of research and development dollars spent on developing technology and applications for multi-wall carbon nanotubes with relatively little commercial success. One of Case Western Reserve University's commercial partners, Designed Nanotubes, LLC (DNT), has discovered how to convert these nanotubes into "Molecular Rebar" (MR) in high yields and purity. MR has been coined to describe materials that are individual, high length to diameter nanotubes that can have functional groups on the outer wall. The MR, when dispersed properly in materials, adds tremendous increases in mechanical, electrical, and ion and heat transfer properties as originally predicted by scientists working to develop carbon nanotubes. With the proper outer wall chemistry, the MR can be dispersed into plastics, rubbers, battery materials, low melting metals, cements, ceramics, and other materials changing the design limits and boundaries for these materials for use in many applications. Case Western Reserve University's expertise and facilities dedicated to advanced materials will provide the necessary platform from which a stream of new MR enhanced materials will be created and vetted for market entry.

The first two applications to be developed are for rubber parts and tires and for lead acid batteries. For rubber products, the MR dramatically improves wear, tear, strength, modulus, static dissipation, adhesion and heat transfer properties and allows the tire designer to redesign the tire with a new "set of rules". Tires can be developed with longer life and thereby lower cost per mile of ownership, with lower weight and rolling resistance and thereby higher fuel mileage and with a combination improving both tire and gasoline mileage. Tires are in test on the road to show that the MR has a positive impact on performance.

For lead batteries, a very small amount of the MR added to the anode and cathode materials allows for more energy storage, much faster charge and discharge rates, better lifetime, and better low temperature performance. Lower battery

CASE WESTERN RESERVE UNIVERSITY
INSTITUTE FOR ADVANCED MATERIALS

10900 Euclid Avenue
520 Kent Hale Smith Building
Cleveland, Ohio 44106-7202
(216) 368-0067

weight and reduced battery size are near term potentials from this development initiative. Several battery companies have expressed interest in pursuing introduction of this technology into the market and discussions remain underway to determine the most suitable commercialization pathway.

These two initial applications are in the scale-up phase and require a market development plant built to verify the process technology and the product performance. The IPP will allow for the first large scale plant to be built using purchased carbon nanotubes modified into MR. The process will be demonstrated using Ricerca Biosciences as the manufacturer and NMF to supply critical pieces of equipment into the rubber industry, specifically. The materials generated will be used to develop, first, the rubber product and then used to develop the lead battery technology. Later in the project, materials will be directed into other targeted applications supplementing technological developments in lithium batteries, alkaline batteries, epoxy composites, capacitors, and printable photovoltaic materials, each of which is a key area of research expertise at Case Western Reserve University.

MR is a new basic building block allowing for a whole new generation of materials in every industry. This platform based facility is intended to serve as the nucleus for many more technologies and companies for Ohio.

Sincerely,

James Pae
Operations Director
Institute for Advanced Materials, Case Western Reserve University

IPP 12-224

Letter of Intent

Lead Applicant: The University of Akron

Address: The University of Akron, 302 Buchtel Common, Akron, OH 44325-2102

Phone Number: 330-972-6459 (Office of Research Services and Sponsored Programs, Emily Njus)

Contact Person: M. Cakmak (330-972-6928) (cakmak@uakron.edu)

Proposed Project Title: Development and commercialization of Transparent conductive flexible film manufacturing for Emerging Flexible Electronics Market

Estimated State Funds to be Requested: $3,000,000

Collaborators: Akron Polymer Systems Inc., Kent Displays Inc.

Project Summary

We are at the genesis of Flexible Electronics transformation of everyday devices including displays, LED lighting, photovoltaics. This market is expected to rapidly expand into $350 billion market by mid 2020's. In their current rigid form, these and many other devices use transparent and electrically conductive electrodes as critical active component. The most widely used forms of these electrodes are Indium Tin oxide (ITO) coated glass or polymer. ITO coated on plastics, though can be conformed into once or twice only gentle curvatures, are unable to take rolling and unrolling into scroll of small radii of curvative as they undergo cracking due to their inherent brittleness.

At the University of Akron, a novel roll to roll hybrid pilot scale machine was developed as part of the previously funded Wright Center of Innovation CMPND. With this hybrid machine endless nanosized (200 nm or less) conductive nanowires are embedded on the surface of a solution of polymer or photocurable monomer and subsequently the films are dried or photocured to capture these essentially endless nanofiber forming a network at and near the surface. With this continuous process, a high transparency and moderate electrical conductivity has been achieved and small scale demonstrators have already been built. These include switchable flexible windows and transparent window heaters. With this key development of electrospinning/film casting hybrid process, medium scale films have been produced and sampled. Because the nanofibers are partially embedded in transparent medium at or near one of their surfaces, they do not have a distinct interface that is prevalent in other transparent conductive film forms. The presence of distinct interface is the inherent weakness of these competing technologies that lead to delamination and/or cracking. Cyclic testing of these nanofiber embedded films show no changes in conductivity and other critical properties after undergoing several hundred cycles of bending while competing films lead to cracking/delamination leading to loss of function that is critical in flexible electronic devices that undergo rolling and unrolling during their use.

This hybrid process can be applied to wide range of conductive materials to form nanowires/fibers as well as wide range of polymers or photocurable monomers to form the matrix. Therefore this technology represents a flexible platform technology.

The main objective of this proposal is to further develop, optimize and commercialize high conductivity flexible/transparent through the use of materials of higher conductivity while matching the refractive index between the fibers and matrix materials with dialable optical properties either through solution or photocurable resin route. We have also demonstrated that these films are easily laser patterned to be used as flexible circuits. This technology is also suitable for very high conductivity applications such as flexible circuits where transparency may be sacrificed for high conductivity while still maintaining flexibility.

This project represents a close supply chain partnership between Akron Polymer Systems Inc., The University of Akron and Kent Displays Inc. Akron Polymer Systems is a specialty resin manufacturer that will provide key expertise in transparent high performance resins including colorless soluble polyimides as well as photocurable monomers. The University of Akron will integrate these materials and conductive materials using multi-nozzle electrospinning (36 nozzles) platform mounted downstream of solution/monomer casting line and produce pilot scale flexible transparent conductive films. Kent displays will then integrate these materials into flexible displays and other devices. We plan to integrate elastomeric versions of these devices into biomedical plastics devices. The University of Akron plans to spin off manufacturing company to produce these transparent conductive films.

IPP 12-225

WRIGHT STATE UNIVERSITY

LOI for OTF Innovation Platform Program FY2012

Date: Wednesday, Dec. 28, 2011

Lead Applicant:
John Mackay, Business Development Officer
Wright State University
College of Engineering & Computer Science
3640 Colonel Glenn Highway
Dayton, OH 45435
Office: 937-775-5257
Email: john.mackay@wright.edu

Subject: "2012 IPP LOI"

Submitted To: IPP2012@development.ohio.gov

Project Title: Development of a Direct Parts Manufacturing Platform

Estimated Grant Funds: $3 million

Known Collaborators: Mound Laser and Photonics Center, Morris Technologies

Project Summary:

Direct parts manufacturing (DPM) is a manufacturing process which creates physical parts directly from 3D CAD files using computer-controlled additive fabrication and machining techniques with minimal human intervention.

The benefits of DPM include: improved energy efficiency, reduced material waste, speed and enabling the production of complex geometries. Despite its potential, DPM has not been adequately demonstrated for widespread commercial use. Wright State University will lead a team to develop and demonstrate a Direct Parts Manufacturing (DPM) process to reverse engineer and inexpensively replicate complex, expensive components. The effort will reduce initial procurement costs eliminating sole-source components; it will reduce and/or eliminate logistics costs by eliminating the need to warehouse replacement parts, and it will develop DPM as an alternative manufacturing process.

IPP 12-226

THE UNIVERSITY OF TOLEDO
1872

December 28, 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

Subject: Letter of Intent to Propose – Ohio Third Frontier Innovation Platform Program – Small Gas Turbine Platform for Propulsion and Power Products

Dear Sirs:

The University of Toledo (Toledo, OH), as the Lead Applicant (participant), intends to propose a program for the Ohio Third Frontier Innovation Platform Program for fiscal year 2012. Teledyne Turbine Engines (Toledo, OH), a business unit of Teledyne Technologies, Inc., will be a key commercial participant for the proposed program. Together, The University of Toledo and Teledyne Turbine Engines will develop the proposal and organize the entire team, consisting of other academic institutions and industrial participants, to deliver an innovative technological program that will achieve new propulsion and power products and create an abundance of new jobs in Ohio.

The Lead Applicant is The University of Toledo, which is located at 2801 W. Bancroft, Toledo, OH 43606-3390. The contact person is Dr. Abdollah A. Afjeh, Chairman of the Mechanical, Industrial and Manufacturing Engineering Department in the College of Engineering. His telephone number is: 419-530-8210. His e-mail address is: aafjeh@utoledo.edu. His address is: The University of Toledo, Department of Mechanical, Industrial and Manufacturing Engineering, MS 312, 2801 W. Bancroft, Toledo, OH 43606-3390.

The title of the intended program is: Small Gas Turbine Platform for Propulsion and Power Products. The intended program value is projected in range of $5,000,000 to $6,000,000 with state of Ohio (Third Frontier) funding in the range of $2,500,000 to $3,000,000. The intended program will be highly focused on technology development with new product generation and Ohio job creation, the centerpieces of the program objectives. The intended program description is provided on the attached single page. The proposed program is intended to have a three (3) to five (5) year technical duration, leading to an enduring product development lifetime extending well beyond the proposed program end with corresponding lasting jobs for Ohio residents.

Respectfully yours,

Abdollah A. Afjeh

Abdollah A. Afjeh, Ph.D., P.E.
Professor and Chair

College of Engineering
Mechanical, Industrial and Manufacturing Engineering • Mail Stop 312 • 2801 W. Bancroft St. • Toledo, Ohio 43606-3390
419.530.8210 Phone • 419.530.8206 Fax • www.mime.eng.utoledo.edu

INNOVATIVE PLATFORM PROGRAM DESCRIPTION:
Small Gas Turbine Platform for Propulsion and Power Products

- **Strategic Goals**
  - Research and development (R&D) for advanced small adaptive cycle aircraft and advanced propulsion and power systems for market expansion with ohio job development for military and commercial systems with derivatives for ground power applications through new product introductions
  - R&D focus for aircraft propulsion and ground power systems
    - Small Gas Turbine Engines
    - Distributed Power Engine Systems
    - Components
    - Materials
    - Controls and Software
    - Subsystems
    - Manufacturing
    - Readiness for flight and power demonstrations for transition to new and existing products
- **Scope of Economic Development From R&D Tasks**
  - Small gas turbine based product R&D for eco friendly flight and ground power
  - Technology for systems - subsystems for distributed power to enable aircraft and ground power products leading to expanded Ohio jobs creation
  - Key Component Technology R&D leading to demonstrations and products
  - Advanced components, materials and manufacturing R&D for cost competitive products
- **Objectives:**
  - Create and retain Ohio jobs at prime engine OEM's and sub-tier suppliers in Ohio
  - Develop new Ohio companies
  - Develop Ohio R&D capabilities for laboratories and labor expertise
  - Develop competitiveness for Ohio's significant gas turbine engine industries
  - Commercialize new Ohio developed technologies for two (2) new engine products through Technology Readiness Level 7 (demonstrated flight capability or ground power application field demonstration)
- **Potential Participants with Cost Sharing**
  - Build from Northwest Ohio Small Turbine Institute base
  - Principal organizations
    - The University of Toledo (Lead)
    - Teledyne Technologies (Teledyne Turbine Engines)
    - Other organizations (academic and industrial) will be included
  - Utilize Ohio Third Frontier funding for program development

College of Engineering
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419.530.8210 Phone • 419.530.8206 Fax • www.mime.eng.utoledo.edu

Cleveland Clinic

December 29, 2011

Letter of Intent
Ohio Third Frontier
Innovation Platform Program
Fiscal Year 2012

To: **Technology and Innovation Division, The Ohio Department of Development**

From: **Cleveland Clinic**

Subject: **Innovation Platform Program: Traumatic Head Injury Neurologic Quantifier (THINQ)**

Please accept this correspondence as an indication of our intention to submit a proposal for the 2012 Innovation Platform Program to establish a collaboration supporting technology commercialization in the field of neurological assessment via the Traumatic Head Injury Neurologic Quantifier (THINQ). As required, information regarding our proposal follows.

1. **Lead Applicant Information:**
   Cleveland Clinic
   9500 Euclid Avenue
   Cleveland, Ohio 44195
   Tel: 216-444-5757
   Fax: 216-445-6514
2. **Contact Person:**
   Adam Bartsch PhD
   Cleveland Clinic Head, Neck & Spine Injury Research
   Phone: 216-363-5749
   e-mail: bartsca@ccf.org
3. **Proposed Project Title:**
   Traumatic Head Injury Neurologic Quantifier (THINQ)
4. **Estimated Grant Funds to Be Requested:**
   $3,000,000
5. **Known Collaborators:**
   Under discussion

6. Summary of Proposed Project:

Neurological health is at the forefront of the collective consciousness. Concussion and traumatic brain injury (TBI) have become the signature injury of athletes and soldiers in the 21st Century, due in no small part to these injuries being highly publicized in the media. Likewise, we face an aging population with increased prevalence of Alzheimer's disease and other forms of dementia. Recent years have seen advocacy for and awareness of neurodegenerative diseases such as multiple sclerosis and Parkinson's disease. A Cleveland Clinic-led collaborative effort, known as the Traumatic Head Injury Neurologic Quantifier (THINQ) is well positioned to play a pivotal role in bringing disruptive technologies and products for neurological assessment to the marketplace, enable growth and innovation in the growing neurological assessment industry and promote positive change in healthcare.

Cleveland Clinic experts in biomedical engineering, neurosurgery and sports medicine have collaborated in developing THINQ, a validated combination of platform technologies, pairing the Intelligent Mouthguard (IMG) dosimeter and I-COMET multi-modal neurological assessment, that can both (1) measure potential brain-injuring dosages as they occur – such as an impact during a sporting event or battlefield blast – as well as (2) assess dosage effects on neurological performance after the event. While software systems exist to assess cognitive function alone, a reliable, objective platform like I-COMET is the first to comprehensively assess cognitive and motor function. This platform project's emphasis will be to commercialize THINQ developed neurological assessment technologies and through partner collaboration introduce new modalities to different health indications. It is envisioned that ongoing THINQ research at the Cleveland Clinic will lead to the formation of a pipeline of developing technologies which will produce a line of new neurological assessment, protection and treatment products for the commercial marketplace and help solidify Ohio's leadership position in this growing field.

IPP 12-228

Letter of Intent for a Proposal to the Innovation Platform Program, ODOD
Date: Dec 28, 2011
Lead Applicant: The Ohio State University
Address: 1960 Kenny Rd.
Phone No. 614-688-3684
Contact Person: Mike Sumption
e-mail: sumption.3@osu.edu
Estimated Funds Requested: $2,000,000
Known Collaborators: Hyper Tech, General Electric, Global R&D, Eden Cryogenics
Project Title: Superconducting Wind Turbine Generator Systems: Materials, Device, and System Development, Evaluation, and Integration

Summary of the Proposed Project:

This proposal is dedicated to the further development and strengthening of existing university-industry collaborations centered around OSU's MSE-SuTC (Superconducting Technology Center), the core of an existing innovation platform that has been working with industry partners to develop a new generation of conductors and magnets for MRIs as well as commercially viable superconducting fault current limiters, and now desires to apply this expertise to Large Superconducting **Wind Turbine Generator Systems: Materials, Device, and System Development, Evaluation, and Integration**. The IPP is based on first an ongoing and effective co-development efforts in the area of superconducting materials and machines between OSU's Superconducting Technology center (SuTC) and corporate partners Hyper Tech Research, Eden Cryogenics, and Global R&D. This group, presently developing materials and devices for medical and energy applications, will use this new initiative to pursue a rapidly developing area of green energy technology, specifically large Superconducting Wind Turbine Generator devices for offshore wind-based energy generation. In doing so, we will expand on presently ongoing development work being pursued within our IPP. Included within focus of this expanded platform will be capabilities for blade materials evaluation and a motor/generator design optimization component. Several new commercial collaborators (including Ohio based companies) will be included in this platform, as well as anticipated end users of devices and products to be developed in this initiative. The program will take advantage of existing supply chains within Ohio. The Environmental Law and Policy center (ELPC, http://elpc.org/) estimates that there are at present 106 companies in the wind energy supply chain in Ohio and 7,500 jobs associated with this. Also, Ohio has a number of existing wind farm sites, and there are plans for expanded development of offshore wind energy sites in Lake Erie.

Our IPP addresses a key area of green energy opportunity, as recognized by the US Department of Energy and the new programs of several commercial entities that are pursuing superconducting generators for offshore wind-based energy generation, including GE, Teco Westinghouse, Advanced Magnet Laboratory, American Superconductor, Hyper Tech, and others. However, critical to the commercialization of wind energy for large markets is the development of wind turbine generators which are maximally cost efficient to compete with present day fossil fuel costs. Non-superconducting generators are being developed and deployed for offshore wind systems that can produce 5-7 MW of power. However, in order to be truly cost competitive, the DOE has concluded that larger capacity systems, 10-20 MW, with smaller size and lower weight must be made in order to lower construction and installation costs. This would allow competitive energy pricing. Additionally, the supplies of the rare earth elements needed to fabricate the magnets for conventional systems are limited and the costs are rising. Using low cost superconducting options, lightweight, direct-drive 10 MW superconducting generators can be made which will reduce system weight by a factor of three, which is a strong cost-determining factor. This IPP proposed to accelerate and enable ongoing developmental efforts at several Ohio companies to become significant players in the offshore wind energy sector. The focus of the program will be on helping the commercial collaborators take existing materials and emerging system designs to market by materials and system design verification and testing. The anticipated results include benefiting the named collaborators on the project, as well as other companies in Ohio's wind energy supply chain, with the resulting expansion of opportunities in Ohio.

IPP 12-229

Title: Center of Excellence for Sustainable Functional Polymers & Composites
For the Innovation Platform Program (Advanced Materials)

Lead Applicant: University of Toledo
Contact Person: Maria R. Coleman
MS 305, 2801 W. Bancroft Street, Toledo, OH 43606.
Phone: 419 530 8091 Fax: 419 530 8086
Email: maria.coleman6@utoledo.edu

Estimated requested amount: 1.0M
Known collaborators: PolyOne, Inc., Suganit, Inc.

SUMMARY OF THE PROPOSED PROJECT:
Fields: Advanced Materials, Polymers, Green Chemistry & Engineering

The proposal will seek funds to form a 'Center of Excellence for Sustainable Functional Polymers & Composites' to create an economic and technological engine to efficiently produce polymer compounds and composites from renewable feedstocks. This Innovation Platform Program will build infrastructure and strengthen collaborations for producing polymers, composites and nanocomposites from renewable resources using novel sustainable processing methods. The center will be housed at the University of Toledo to extend the commercial incubation and strong technological resources of the university and its partners. This integrated academic-industrial consortium will take a full supply chain approach to solving technical challenges to commercialization of bio-derived polymers.

The proposed efforts are consistent with the goals of the newly established School for Green Chemistry and Engineering at the University of Toledo and interests of our industrial partners. While the proposal will target two classes of bio-derived polymers (i.e. thermoplastics such as polycarbonate and elastomers), the facilities and methods developed over the course of this project can be extended to much broader classes of advanced materials. Two broad approaches will be used to address production of sustainable polymers and composites: (i) Use of renewable feedstock sources (i.e. biomass) for monomers, fillers and additives and (ii) Alternative polymer production methods that reduce waste generation, along with solvent and energy use.

Despite wide interest in renewable carbon sources, commercialization of bio-derived products is still in its infancy and there are many opportunities for commercialization within polymers and composites. Reduction of costs will be targeted to improve commercial viability of bio-derived composites. Incorporation of bio-derived materials into the product streams of our industry collaborators is essential in meeting goals for reduced carbon footprint and use of green chemistries. The state of Ohio, with its strong positions in manufacturing and agriculture, can lead efforts to commercialize bio-derived polymers with investment in an academic – industry consortium to enhance synergies among industry and academic partners, reducing repetition of research and directing efforts for overcoming common challenges.

IPP 12-230

Cleveland Clinic

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
IPP2012@development.ohio.gov

28 Dec. 2011

Subject: 2012 IPP LOI

Lead Applicant's Name: Cleveland Clinic

Address: 9500 Euclid Ave, A91, Cleveland, OH 44195

Phone Number: 216-445-5763

Contact Person: Dr. Raed Dweik

Email Address for Contact Person: Dweikr@ccf.org

Proposed Project Title: Center for Breath Analysis (CBA)

Estimated State Funds to be requested: $3,000,000

Known Collaborators: Syft Technologies, Makel Engineering,

Summary of Project:

With each breath we exhale, thousands of molecules are expelled in our breath. Each individual has a "breath-print" that can tell a lot about his or her state of health. Breath analysis is rapidly evolving as the new frontier in medical testing. The end of the 20th century and the beginning of the 21st century, however, have arguably witnessed a revolution in our understanding of the constituents of exhaled breath and the development of the field of breath analysis and testing. Thanks to major breakthroughs in new technologies (infrared, electrochemical, chemiluminescence, and others) and the availability of mass spectrometers, the field of breath analysis has made considerable advances in the 21st century. Several methods are now in clinical use or about ready to enter that arena.

To advance in this field, however, there has to be a close collaboration between technical experts who typically have a device looking for clinical application, the medical experts who have the clinical problem looking for a test/biomarker that can be helpful in diagnosis or monitoring, and industry/commercial experts who can build and commercialize the final product. Establishing and nurturing such important collaborations will assure the established of Ohio as an international leader in this rapidly advancing field of breath analysis. This is the goal of the proposed Center for Breath Analysis.

As pioneers in this technology, our team has been involved in this field practically since its modern inception. The breath analysis laboratory at the Cleveland Clinic continues to be at the cutting edge of this new field and draws on the strengths of the Departments of Pulmonary and Critical Care Medicine in the Respiratory Institute and Pathobiology in the Lerner Research Institute. Clinical and biological exhaled breath markers as predictors of treatment response are being tested in lung cancer, asthma and pulmonary hypertension as well as diseases beyond the lung including liver disease, renal failure, diabetes, and infections among others.

The goal of establishing the Center for Breath Analysis is to build on our ongoing work to enhance and formalize the interaction between scientists, clinicians and industry partners. An important mission of this center will be to continue to develop new sensors and build and test new analyzers to detect other substances in exhaled breath in a variety of disease states. This will help advance the Clinic's mission in innovation in healthcare by eventually allowing us to provide not only world class care for all our patients, but also personalized care for each individual patient based on his or her own unique "breath-print". The CBA will provide and coordinate ongoing research and development efforts at Cleveland Clinic with local companies focused on commercializing these products into the market, establishing northeast Ohio as the international leader in this rapidly emerging.

IPP 12-231

Lead Applicant's Name: The Ohio State University

Address: Center for the Accelerated Maturation of Materials, Department of Materials Science and Engineering, The Ohio State University, 2041 College Road, Columbus, OH 43210

Phone Number: (614) 292-2708

Contact Person: Dr. Hamish L Fraser, Ohio Regents Eminent Scholar and Professor (fraser.3@osu.edu)

Project Title: Development of Accelerated Efficient Manufacturing Processes

Estimated Funding (State) Request: $3,000,000

Known Collaborators: EWI, Timet Corporation, FEI Company

Project Summary:

Executive Statement: This proposed program aims to integrate three existing innovative platforms (strengths) at OSU's Center for the Accelerated Maturation of Materials (CAMM), namely laser additive processing, materials characterization, and computational materials science and engineering (CMSE), to permit the development of efficient manufacturing processes that incorporate the ability to predict both *microstructure evolution* during processing and *properties*, based on those microstructures, of the processed components. This unique capability is completely consistent with the Nation's thrust involving incorporation of Integrated Computational Materials Engineering (ICME) into R&D, engineering, and manufacturing processes. The integration of materials characterization and CMSE with manufacturing will permit significant reduction in the time required to develop commercial components, with an attendant reduction in costs, resulting in a marked increase in competitiveness for Ohio's manufacturing companies. This increased competitiveness will be exploited through a commercialization plan that will be described in detail in the proposal.

Problem Statement: There has been considerable development of efficient manufacturing processes in the recent past. One of the most attractive has involved additive manufacturing, with either lasers or electron guns as the power source, and powders or wire as the additive feed stock. In the main, this development work has been the domain of materials processing engineers, with efforts focused on the development of the process itself. It is well known in most metallic structural alloys (e.g., advanced aerospace and automotive alloys) that microstructure plays a significant role in influencing the properties exhibited by the processed material (e.g., a given component of interest), and hence the performance of the component. Despite this, there has been little attention paid to the ability to tailor efficient processing schemes such that certain microstructural combinations may be produced in processed materials, such that attractive combinations of properties may be achieved. Because of this, it has not been possible to exploit these novel efficient manufacturing schemes to anywhere near an optimum extent. The

proposed project aims to permit such full exploitation, and permit markedly increased competitive processing schemes to be developed, by the integration of materials characterization and computational materials science and engineering with materials processing. In this way, components for application in commercial systems may be developed and manufactured in an accelerated way, involving minimal experimentation (e.g., currently trial and error), and hence significantly reduced costs.

Key Primary Scientific/Technical Fields: The relevant scientific and technical fields include advanced materials related to specialty metals and alloys (aerospace, automotive, and high technology engineering systems), and aeropropulsion (i.e., materials), materials processing and advanced efficient manufacturing systems.

Summary: The overall aim of this proposed project is to provide ICME-based efficient manufacturing processes, involving in the first instance laser additive manufacturing. By the end of the project period, the aim is to either expand processing activities (i.e., increased employment) at our collaborators plants or spin-off a new manufacturing company whose activities will be based on the innovations developed in the proposed program. As noted above, the proposed project involves the integration of three existing innovation platforms at CAMM (laser additive manufacturing, materials characterization, and CMSE), and so is completely consistent with the purpose of the OTF IPP solicitation.

IPP 12-232

CASE WESTERN RESERVE UNIVERSITY | GREAT LAKES ENERGY INSTITUTE

10900 Euclid Avenue, Olin 305
Cleveland, Ohio 44106-7074
(216) 368-0748
energy.case.edu

December 28, 2011

Dear Ohio Department of Development,

Please accept this Letter of Intent (LOI) from Case Western Reserve University (CWRU) for our 2011 Innovation Platform Program (IPP) proposal.

Lead Applicant's Name:	Case Western Reserve University (CWRU)
Address:	10900 Euclid Avenue Cleveland, Ohio 44106
Telephone:	(216) 368-5186
Contact Person:	Prof. Daniel Scherson
Contact Email:	daniel.scherson@case.edu
Proposed Project Title	**Case Center for Regenerative Energy Storage** (C^2RES)
Estimated Grant Funds to be Requested:	$2 Million
Known Collaborators:	Parker Hannifin, Catacel

Project Summary

The development and optimization of efficient and economical means of storing energy from renewable and intermittent sources, including wind and solar, will have a pronounced impact on mitigating the problems derived from the depletion of the world's fossil fuel reserves. Such will also improve the way in which the electrical grid is currently managed. The versatility of electrochemical energy storage devices – such as batteries, fuel cells, and double-layer capacitors – may hold the key to accomplishing these goals. In particular, capacitors display very high power densities, low energy densities, and sub-second response times. As such, they are suitable for power quality management. In contrast, batteries (including those of the flow redox type) and fuel cells exhibit energy densities high enough to meet the requirements of large-scale electrical energy storage.

This proposal seeks to further develop and optimize regenerative electrochemical energy storage devices, including fuel cells of the H_2-Br_2 (HBrFC)-type and redox flow cells. In particular, the latter ranks among the most attractive electrical energy storage systems from the viewpoints of energy capacity, efficiency, and cost. Among its many advantages, the HBrFC displays extremely fast reaction kinetics, high energy storage capacity, and high reliability. Furthermore, the H_2, Br_2 recombination reaction in a fuel cell allows up to 90% of the chemical energy stored in the reactants to be converted to electricity, which is much higher than for state-of-the-art H_2/air fuel cells, for which the conversion can reach only about 50%. This translates to an electric-to-electric efficiency approaching 80% for H_2/Br_2 systems, compared to 40% for H_2 /air and 35% for most fossil-fuel-fired power generators.

Case Western Reserve University (CWRU) and its partners seek to address this challenge by establishing the **Case Center for Regenerative Energy Storage (C^2RES)**. This facility will be equipped with state-of-the-art instrumentation and equipment for the testing of materials and devices for these types of applications. In particular, the Center will help component manufacturers, including those involved in mechanical and electronic control, to test the performance of new products that will lead to the development of systems with optimized characteristics in terms of cost, safety and overall performance and durability. C^2RES will serve as focus point for scientists and engineers covering the highly diverse disciplines involved in these complex technologies. It will further provide Ohio companies with

CASE WESTERN RESERVE UNIVERSITY | GREAT LAKES ENERGY INSTITUTE

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equipment and expertise otherwise unavailable at their facilities. In order to provide these missing R&D opportunities, C^2RES will transform multiple disjoined and partially-equipped CWRU facilities into one state-of-the-art, contiguous, larger-scale hub. This recognizable space, housed within one of CWRU's main buildings, will connect the talents of multiple disciplines, beginning with renowned abilities in Chemistry and Chemical Engineering. A top-tier physical facility, the Center will offer Ohio companies a local resource to achieve commercial advantage.

Over its initial project period, C^2RES will specifically focus on developing processes and testing protocols for regenerative fuel cells and redox flow cells before and after operation. These post-service evaluations will be focused on lifetime and degradation rates of individual components, which can be chemical, structural, and/or interfacial in nature. For interfacial degradation processes, such as corrosion, adhesive failure, and fracture, much of the groundwork has already been established in Case Western Reserve's Swagelok Center for Surface Analysis of Materials (SCSAM) under prior Wright Project funding. Thus, this funding request will focus on establishing electrical protocols needed for realistic and accelerated testing of materials, components, and systems, as well as on the necessary evaluations needed to track degradation rates and identify mechanisms of failure. Thus, creation of the C^2RES will allow CWRU to offer a more comprehensive spectrum of product improvement to commercial entities.

Specific initial partners in this Innovation Platform Program will be Ohio companies who have active product development activities in the later stages of the Commercialization Framework. CWRU will utilize C^2RES to work with these and other partners on multiple technologies, enabling them to access the required equipment for thorough performance evaluations. As the time of this Letter of Intent, these partners include Parker Hannifin and Catacel, with ongoing discussions with other potential industrial partners, who CWRU hopes to be able to add for the formal proposal.

Sincerely,

Daniel Scherson
Frank Hovorka Professor, Chemistry

IPP 12-233

OHIO UNIVERSITY

December 28, 2011

Ohio Third Frontier
Innovation Platform Program 2012
Technology and Innovation Division
Ohio Department of Development

Re: 2012 Ohio Third Frontier Innovation Platform Program, RFP LOI

Ohio University's Center for Electrochemical Engineering Research partnering with BASF, Zyvex Technologies, and E3 Clean Technologies intends to submit a proposal in response to the Ohio Third Frontier Innovation Platform Program fiscal year 2012 Request for Proposals (RFP) as follows:

Lead Applicant:	Ohio University
Address:	165 Stocker Center Athens, OH 45701
Contact Name:	Gerardine (Gerri) G. Botte, PhD, Russ Professor Director Center for Electrochemical Engineering Research
Telephone Number:	740-593-9670
Email:	botte@ohio.edu
Project Title:	**"Electrochemical Innovation Platform: Advanced Materials for Energy Storage and Sensors"**
Project Areas:	Energy Storage, Sensing
Estimated Requested Grant Funds:	$3,000,000

Collaborators:

BASF Dr. Joseph DiCarlo Commercial & Governmental Program Manager 732-545-5100	Zyvex Technologies Mike Nemeth Director, Commercial and Defense Applications 614-390-0398	E3 Clean Technologies Kent Shields CEO 740-597-9090

OHIO UNIVERSITY

Project Summary

The Innovation Platform, Center for Electrochemical Engineering Research (CEER) at Ohio University, was established with an initial investment from the State of Ohio through the Ohio Third Frontier Program, Wright Project. The Center for Electrochemical Engineering Research (CEER) is devoted to developing solutions to global problems through an electrochemical approach. CEER is dedicated to entrepreneurial electrochemical research, innovation, education, and to economic growth. CEER emphasizes a very collaborative and interdisciplinary approach to these goals. CEER establishes partnerships with companies to support commercialization of technologies leveraging electrochemical expertise, and over $4 million in state-of-the-art facilities and infrastructure. Ohio University has a history of successful Open Innovation partnerships with Industry. CEER, working closely with its sponsored research and technology transfer offices, has developed creative solutions to enable successful partnerships with industry.

The Ohio University Innovation Platform, CEER, has partnered with three Ohio companies to launch new products into the commercial market within three (3) to five (5) years of the Project start date. Supporting three of Ohio's strategic growth areas, the program will support the launch of at least three products with the following opportunities: (1) Advanced materials for lithium batteries for the electric vehicle market, (2) Advanced sensors for aerospace applications, and (3) Emissions control sensors for the diesel automotive market.

IPP 12-234

WRIGHT STATE UNIVERSITY

LOI for OTF Innovation Platform Program FY2012

Date: Wednesday, Dec. 28, 2011

Lead Applicant:
John Mackay, Business Development Officer
Wright State University
College of Engineering & Computer Science
3640 Colonel Glenn Highway
Dayton, OH 45435
Office: 937-775-5257
Email: john.mackay@wright.edu

Subject: "2012 IPP LOI"

Submitted To: IPP2012@development.ohio.gov

Project Title: Terahertz-Based Medical Imaging Platform

Estimated Grant Funds: $3 million

Known Collaborators: TBD

Project Summary:
Terahertz radiation is the last band within the electromagnetic spectrum to be commercially exploited. Terahertz radiation lies between what typical photonic devices and typical electronic devices can generate with any appreciable amount of power; however, it has been known for some time to be one of the richest spectral regions from a phenomenological standpoint. Terahertz radar can detect the presence and composition of certain organic and biomaterials. Thus, for military and security applications, terahertz radar can detect certain explosive materials, poisonous gases, and biological warfare agents. In the medical arena, terahertz waves can image and diagnose various skin maladies, including burns, skin cancer and diabetic ulcers. This program will entail collaboration between Wright State University and various Ohio businesses to use terahertz-based imaging to pursue commercial applications of this technology in the biomedical industry and other targeted applications.

IPP 12-235

CASE WESTERN RESERVE UNIVERSITY EST. 1826

Department of Chemical Engineering
Case Western Reserve University
Cleveland, OH 44106
(216) 368-2728 (216) 368-3016 (fax)

Robert F. Savinell, PhD, PE
George S. Dively Professor of Engineering
robert.savinell@case.edu

12/27/11

Dear Ohio Department of Development,

Please accept this Letter of Intent (LOI) from Case Western Reserve University (CWRU) for our 2012 Innovation Platform Program (IPP).

Lead Applicant's Name:	Case Western Reserve University (CWRU)
Address:	10900 Euclid Avenue Cleveland, Ohio 44106
Telephone:	(216) 368-2728
Contact Person:	Prof. Robert F. Savinell
Contact Email:	rfs2@case.edu
Proposed Project Title:	Energy Storage Validation Center (ESVC)
Estimated Grant Funds to be Requested:	$3 Million
Known Collaborators:	TBD

Project Summary:

Energy storage offers promising solutions to the challenges of our aging and evolving power grid. Technologies such as flow batteries can both improve the reliability of the existing grid, as well as speed the inclusion of renewable energy generation. A significant barrier, however, lies in the unproven nature of energy storage at the grid-scale. Potential customers, including major utility companies, seek a credible resource to vet and test these capital-intensive devices. Further, once a technology's ability to meet initial standards is established, questions linger regarding performance over lifetime, which is necessarily long due to significant up-front investment. Without a robust platform to provide these answers, emerging energy storage companies, including those in Ohio, go without a trusted voice to make their products commercially viable.

Case Western Reserve University (CWRU) and its industrial partners seek to address this challenge by creating the Energy Storage Validation Center (ESVC). The ESVC will provide a unified facility to accelerate the commercial adoption of energy storage systems in the grid by connecting and supporting relevant stakeholders and quantifying and promoting the advantages of solutions that work. The Center's mission then, is – thru validation and test support – to help identify and remove the gaps and "friction" that exist in the energy-storage delivery chain to further the adoption of energy storage in the electric grid. As well, the ESVC – drawing on CWRU's 2011 funded Wright Project the *Solar Durability and Lifetime Extension* (SDLE) Center - will insert reliable, accelerated lifecycle testing and mechanistic modeling into the early stages of product development. This improvement will allow industries to produce superior products by selecting better materials, components, and systems up front based on lifetime and degradation science. Such products will last reliably for > 20 years or more.

Beginning with a broad class of flow batteries, the ESVC's initial project will be to develop testing, validation, and lifetime extension capabilities for energy storage. Such capabilities will provide Ohio companies with competitive advantage, as well as establish the Ohio region as an intellectual and technology leader in the space in the short and long term. To enable this work, the project will draw on the key primary/scientific fields of Chemical Engineering, Materials Science and Engineering, Electrical Engineering and Computer Science, Systems Engineering, and Electrochemistry, all of which are strengths of CWRU. The platform will further build on renowned CWRU centers such as the Yeager Center for Electrochemical Sciences, the Electrochemical Energy Engineering Laboratory (EEEL@Case), SDLE, and the Wind Energy and Research Commercialization (WERC) Center.

Initial partners in this Innovation Platform Program project will be several. Early partners may include major utility companies, of which several of the nation's largest operate in Ohio As well, new grid-storage providers who are less-experienced in the grid, but who have potentially important innovations to offer, will be directed/strongly encouraged to come to the ESVC to be acquainted in depth with grid-storage practices and market realities. Storage providers interested in selling products to the power companies will also be directed/strongly encouraged to submit production items—importantly, with at least a working skeleton of the power electronics—for grid-realistic Verification (of subsystems), Validation (of total storage systems), and Accreditation exercises under controlled testbed conditions. Companies providing ancillary services, as well as interested researchers from academia, will be invited to utilize the ESVC's resources as well.

If successful, this Innovation Platform Program will leverage the considerable investment Ohio has made in energy, including existing facilities and capacity in electrochemical energy, wind power, and lifetime and degradation science at CWRU. Ohio companies can further leverage this investment to innovate and increase competitiveness in the global energy storage market, which is rapidly growing. The end result will be sustained industry engagement, leadership, and job creation for Ohio.

Sincerely,

Robert Savinell, Ph.D.

IPP 12-236

Lead Applicant: Case Western Reserve University

Address: 10900 Euclid Ave. Cleveland, OH 44106, (216) 368-6499

Contact Person: Dr. David Schwam, dxs11@case.edu

Estimated State Funding Requested: $1M

Known industrial collaborators: Norman Noble

Project Title: Center for Reactive Alloys Development

Summary: The proposed Center for Reactive Alloys Development is an Innovation Platform for development and pilot plant scale production of advanced reactive alloys. The Center will support new technology and advanced alloys applications at Ohio companies with the goal of new commercial products. Key areas of development include:

1. Nitinol alloys for biomedical implants i.e. stents and dental braces.
2. Nitinol shape-memory alloys for actuator applications.
3. Titanium alloys for aerospace applications (compressor blades)
4. Corrosion resistant titanium alloys for marine applications
5. Rare-earth alloys for magnets
6. Turbine blade superalloys

Melting, casting and heat treating of these alloys requires special handling under high vacuum or inert gas environment. A new facility established at CWRU as part of the Nitinol Accelerator TFP has been recently completed. It comprises state-of-the –art differential scanning calorimetry, vacuum arc melting and vacuum heat treatment. Net-shape casting, forging and extrusion equipment is on hand for further processing of the cast alloys. A broad range of mechanical testing and microstructural characterization in the Department of Materials Science and Engineering will be employed in the development. The processing and thermal analysis activities will be guided by computational alloy development. The faculty associated with the Center has the scientific/ technical expertise as well as a strong track record of industrial collaborations. The development effort will be closely coordinated with the industrial participants to ensure a seamless transition to the production facilities and applicability to specific commercial products.

IPP 12-237

Letter of Intent
Request for Proposals
Ohio Third Frontier Innovation Platform Program 2012

Prospective Lead Applicant:	Office of Research and Economic Development The University of Toledo, Toledo, OH 43606 Phone # 419.530.2844
Prospective Collaborators:	SuGanit Systems Inc., Suite # 210 Research and Technology Complex 1, 2600 Dorr Street, Toledo, OH 43606 SynTerra Energy 383 West Dussel Drive Maumee, Ohio 43537 PolyOne Corporation 33587 Walker Road Avon Lake Ohio 44012 Algae Producers of America 5600 Chapin Road Madison, OH 44057
Contact person: Phone: E-mail: Address:	**Sasidhar Varanasi,** (419) 530-8093 sasidhar.varanasi@utoledo.edu Dept. of Chemical & Environmental Engineering, The University of Toledo, Toledo, OH 43606
Proposed Project Title:	**Center for green chemistry and engineering of renewable feedstocks for producing materials and value-added products.**
Estimated Grant Funds To be requested:	$3 millions from Ohio Third Frontier Innovation Platform Program + $3 millions (Cost Share by the applicants)

A brief summary of the proposed project is provided on the next page.

Center for green chemistry and engineering of renewable feedstocks for producing materials and value-added products.

The goal of the propose center is to commercialize the patented technologies developed at The University of Toledo that efficiently convert non-food biomass feedstocks into high value-added products and materials. The center will be housed in the University of Toledo to extend the commercial incubation and strong technological resources of the university and its partners. The facilities will be unique in Northwest Ohio. The nexus of railroads, highways and shipping through the Port of Toledo provides a gateway for transport of feedstock and manufactured products. The Center will facilitate the diversification of the manufacturing focus of the region towards green technologies. This will also boost the regions existing strengths in renewable energy from solar and biomass sources.

The infrastructure supported by the proposed projects will support both near-term and long-term commercialization and product development from bio-based feedstocks to value-added products through sugar, lipid and thermochemical platforms as shown in Figure 1. These platforms represent the front-end processing of lignocellulosic (*i.e.* agricultural and forestry waste) and lipid-rich (*i.e.* algae and oil seeds) biomass feedstocks to produce sugars, lipids, aromatics and hydrocarbons that, in turn, form the precursors for the production of a value-added materials, chemicals, and fuels.

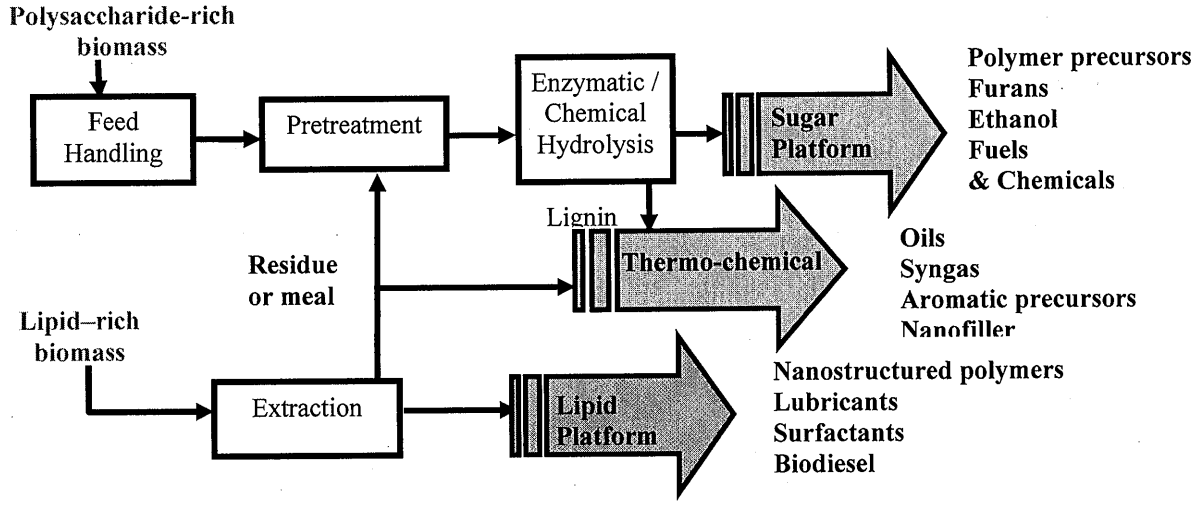


Figure 1. Pathways associated with the sugar, lipid and thermo-chemical platforms for biomass utilization to produce value-added products. Not shown is conversion and compounding of polymer precursors to polymers.

The proposed center will build on strengths in research expertise at the University of Toledo (UT) in biomass conversion to sugars and aromatics, catalysis and polymer development. Incorporation of bio-derived materials into the product streams of our industry collaborators will be essential in meeting goals for reduced carbon footprint and incorporation of green chemistries.

IPP 12-238

Title: Manufacturing and Commercialization of Value-added Orthopedic Products from Cheap Raw Materials
Submitted to the Innovation Platform Program

Lead Applicant: Sarit B. Bhaduri, University of Toledo
MS 312, MIME, 2801 W. Bancroft Street
Toledo, OH 43606. Phone: 419 530 8223 Fax: 419 530 8206
Email: sarit.bhaduri@utoledo.edu

Estimated requested amount: $2M
Collaborators: JNP Group, LLC; Spinal Ventures; Replication Medical, Inc; and X-Spine.

SUMMARY OF THE PROPOSED PROJECT

In accordance with the Technology Commercialization Framework as practiced in Ohio, the aim of this comprehensive Innovation Platform Program (IPP) proposal is to commercialize value-added orthopedic products from cheap raw materials. The University of Toledo will spearhead the effort by leveraging the resources provided by our collaborators, including the JNP Group, LLC; Spinal Ventures; Replication Medical, Inc.; and X-Spine. The idea is to further scale-up the innovative biomedical products that are being developed at educational and commercial locations within Ohio. The proposed effort will help in catalyzing the development work beyond the valley of death into commercially viable products.

The focal point here will be calcium phosphate (CaP) based materials. This interdisciplinary project will have strong links with the agro- and biomedical industries of Ohio, which according to the Battelle studies are dominant industries in Ohio. The main theme is the development of a new generation of CaP-based cements with multifunctional capabilities for repairing a broad range of complex bone defects and fixation of implants. These will include ease of administration at the defect site by a simple injection, providing the initial strength and haemostatic capability, and helping with eventual hard tissue regeneration.

With the above theme in mind, it is anticipated that a number of *state-of-the-art* equipment will be procured and placed in various laboratories. Physical evaluation equipment will include a Digital Motion X-ray Machine, a micro-indenter equipment (Biodent/Quad group), and a Nanoindentor (Hysitron). Cell culture equipment will include a Multi Photon Excitation (MPE), Confocal Microscope (LSM 510 NLO META, Carl Zeiss Inc.), customized dual fiber electrospinning apparatus (Glassman MK30), Nucleofector (Amaxa), Laser Capture Microdissection System (Arcturus XT, MDS Analytical Systems), Flow Cytometer/Cell Sorter (FACS Aria, BD Immunocytometry Systems), etc. These facilities will help supply the industries with highly-trained local manpower, while simultaneously helping the industrial partners in achieving regulatory clearances. This is expected to benefit the economy and commerce in the state of Ohio in the long run.

IPP 12-239

Cleveland Clinic

Cleveland Clinic Innovations
c/o Jon Heavey, MD MBA
9500 Euclid Ave, GCIC10
Cleveland, OH 44195

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

Subject: 2012 IPP LOI

To Whom It May Concern,

Attached is a letter of intent for the 2012 Ohio Third Frontier Innovation Platform Program. The project information is as follows:

Lead Applicant's Name: Cleveland Clinic

Address: 9500 Euclid Ave, GCIC10, Cleveland, OH 44195

Phone Number: 216-445-2476

Contact Person: Dr. Jon Heavey

Email Address for Contact Person: heaveyj@ccf.org

Proposed Project Title: Neuromodulation Development Platform

Estimated State Funds to be requested: $3,000,000

Known Collaborators: In Discussion

Summary of Project:

Neuromodulation is a field of medicine that uses the electrical signals of the brain to therapeutically stimulate organ systems. It has been used successfully to treat diseases of the central nervous system, to include Parkinson's disease, neuropathies, and psychiatric conditions. It is now being harnessed to treat an even broader set of organ systems and diseases, such as heart failure and stroke. We have developed a comprehensive portfolio of neuromodulation advances to capture opportunities across these emerging therapeutic indications.

Our platform draws upon translatable intellectual property across the full spectrum of development: from early stage concepts undergoing preliminary validation, to advanced in-vivo models prepared for regulatory clearance. Our early stage technologies involve proprietary ideation to advance neuromodulation treatments in multi-organ systems. Our intermediate stage technologies have well established patent protections, as well as mechanisms to initiate in-vivo validation. Our late stage technologies have proven in-vivo validation, and are strategically positioned to deploy to market to maximize job growth and tax revenue.

Two late stage technologies in particular help illustrate the market and growth potential within our development platform pipeline. Our neuromodulation advances in heart failure and stroke treatment can help mitigate two diseases with global implications. Heart failure impacts an estimated 23 million patients worldwide, and it leads to $35B in annual expenses in the United States alone (CMS). Stroke impacts 800,000 patients in the United States each year, leading to $29B in annual expenses in the domestic market (CMS).

Using conservative pro forma assumptions-- including limited early market adoption and full operational staffing expenses-- we anticipate that these opportunities will lead to significant job creation and tax revenue for the state of Ohio over the next five years. We have a prior track record of translating research from bedside ideation to market deployment, and believe our current neuromodulation portfolio is optimally positioned to draw upon that experience. We look forward to discussing how we can partner with you to develop this initiative in Ohio.

Thank you for your consideration.

IPP 12-240

Youngstown
STATE UNIVERSITY

One University Plaza, Youngstown, Ohio 44555
College of Science, Technology, Engineering, and Mathematics
Office of the Dean
330.941.3009
Fax 330.941.3060

December 23, 2011

Ohio Department of Development
Innovation Platform Program
77 South High Street
P. O. Box 1001
Columbus, OH 43216

On behalf of Youngstown State University and our expected collaborators, this Letter of Intent is being submitted to the Third Frontier Innovation Platform Program. The proposed Project is currently entitled: "Distribution of specialized sorbent materials on metal foil for gas separations and storage" and will request an estimated amount of $1,500,000. Information about the Lead Applicant and Collaborators follows.

Authorized Institutional Official:
Dr. Peter J. Kasvinsky, Associate Provost for Research

Technical Contact
Dr. Martin Abraham
Dean, College of Science, Technology, Engineering, and Mathematics, and
Professor, Civil/Environmental and Chemical Engineering
Youngstown State University
One University Plaza
Youngstown, Ohio 44555
phone: 330-941-3009
e-mail: martin.abraham@ysu.edu

Known Collaborators
Catacel Corp.
EMTEC

The Summary of the Proposed Project appears on the next page. We look forward to submitting a full proposal to help support this new collaborative venture. If you have any questions or need additional information, please do not hesitate to contact me. Thank you for your attention.

Sincerely,

Martin A. Abraham, Ph.D., P.E.
Professor, Chemical, Civil, and Environmental Engineering, and
Dean, College of Science, Technology, Engineering, and Mathematics

Project Summary

YSU and Catacel have previously collaborated to develop the technology for applying a nanoparticle coating onto metal foil and demonstrated the value of this technology for use in CO_2 capture. New materials, including selected multiple component and MOF coatings, display performance that meet DOE targets for application in coal-fired power plants and other post-combustion applications. By varying the coating on the foil, this platform can also serve to separate CO_2 from methane in natural gas streams, from anaerobic digester biogas, and in other applications in which gas separations may be required. Similarly, coatings may be applied for use in methane gas storage, with possible application for gas-powered vehicles.

While laboratory studies have demonstrated the technical feasibility of the platform, this IPP project will focus on demonstrating the commercial viability of this technology for gas storage. In particular, we will develop a pilot scale unit to demonstrate the long-term performance of the system through multiple cycles and under conditions that are commercially relevant.

IPP 12-241

CASE WESTERN RESERVE UNIVERSITY
SCHOOL OF MEDICINE

University Hospitals
Case Medical Center

CASE CENTER FOR IMAGING RESEARCH

December 28, 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

***Re*: 2012 OTF IPP LOI**

To Whom It May Concern,

We plan to submit a proposal in response to your **2012 IPP RFP**. The Case Western Reserve University has been working with MIM Software, Inc. on multi-modal imaging as a platform technology for a wide range of medical applications for some time. We have demonstrated success in the field of image registration to merge medical images acquired from multiple imaging modalities for both clinical and pre-clinical applications. MIM Software is one of the leading software companies developing third party solutions for medical imaging display, image data processing and also aiding decision making in healthcare. The title of this proposal is "Multimodality imaging as a platform technology for medical applications". Until recently, new developments in medical imaging have mostly been used in isolation. Functional molecular imaging techniques are increasingly being performed in combination. Multimodal imaging has become an important means for biological investigation because of its multi-dimensional, multi-spectral and multi-scalar nature. By combining the information derived from a number of techniques, it is possible to build a unique, multifaceted phenotypic view of a disease or an organ system. For multimodal imaging to enhance decision making either in new drug development or patient management, the procedural rigor will be established to yield a combined imaging biomarker from different image data sets. A team of investigators/collaborators are thus assembled to implement this.

From Case Western Reserve University (Lead Applicant)
PI: Zhenghong Lee, Ph.D.
The contact person for the Lead Applicant is *Cena Myers Hilliard* at
University Hospitals Case Medical Center, Wearn B40
11100 Euclid Ave.
Cleveland, Ohio 44106
Cena.Myers@UHhospitals.org
Ph: (216) 844-8076
Fax: (216) 844-4987

Our collaborators will be MIM Software, Inc. (Cleveland, Ohio), and potentially, FMI (Akron, Ohio), MedicVision (Cleveland, Ohio) and Plexar (Shaker Heights, Ohio).

ZHENGHONG LEE, PH.D.
ASSOCIATE PROFESSOR, CASE CENTER FOR IMAGING RESEARCH AND DEPARTMENT OF RADIOLOGY
NUCLEAR MEDICINE, RADIOLOGY, UNIVERSITY HOSPITALS CASE MEDICAL CENTER
11100 EUCLID AVENUE • CLEVELAND, OH • 44106
PHONE: 216-844-7920 • FAX: 216-844-3106 • E-MAIL: ZXL11@CASE.EDU

The budget of $3 Million will be requested from the OTF fund for the first three years of the project with a match of ratio of 1:1 for cost share.

Sincerely,

Associate Professor, Radiology and Biomedical Engineering
and General Medical Sciences (Oncology, Stem Cells)
Case Center for Imaging Research

IPP 12-242

CASE WESTERN RESERVE UNIVERSITY
SCHOOL OF MEDICINE

University Hospitals
Case Medical Center

CASE CENTER FOR IMAGING RESEARCH

December 28, 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

***Re*: 2012 OTF IPP LOI**

To Whom It May Concern,

We plan to submit a proposal in response to your **2012 IPP RFP**. The University Hospitals Case Medical Center has been working with Philips Medical Systems (USA), Inc. on PET imaging on different clinical applications for a long time, and have demonstrated success in the important field of translation of basic medical research from pre-clinical experiments to clinical studies. We plan to work together again this time focusing on quantitative aspect of the PET imaging with emphasis on early assessment of treatment response. There are existing criteria for therapy evaluation such as the WHO and RECIST criteria, which are mostly size-based measurement using traditional imaging methods such as planar x-ray radiography, CT, or MRI. There are two issues with these size-based imaging measurements. First, there is a large variation among institutions or even within the same institution for simple one-dimensional measurement. Second, size-based measure is often de-coupled from the underlying biology, and becomes an unreliable or poor readout for many newly developed molecular targeted treatments. Therefore, we propose to establish an innovative platform with this proposal entitled "Dynamic Positron Emission Tomography (PET) imaging as a quantitative imaging biomarker for treatment assessment". A team of key investigators/collaborators are assembled.

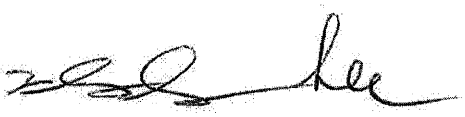
From University Hospitals Case Medical Center (Lead Applicant)
PI: Zhenghong Lee, Ph.D.
The contact person for the Lead Applicant is *Cena Myers Hilliard* at
University Hospitals Case Medical Center, Wearn B40
11100 Euclid Ave.
Cleveland, Ohio 44106
Cena.Myers@UHhospitals.org
Ph: (216) 844-8076
Fax: (216) 844-4987

Our collaborators will be Philips Medical Systems (USA), Inc. (Highland Heights, Ohio), and potentially, Navotek (Cleveland, Ohio) and ViewRay (Oakwood Village, Ohio).

ZHENGHONG LEE, PH.D.
ASSOCIATE PROFESSOR, CASE CENTER FOR IMAGING RESEARCH AND DEPARTMENT OF RADIOLOGY
NUCLEAR MEDICINE, RADIOLOGY, UNIVERSITY HOSPITALS CASE MEDICAL CENTER
11100 EUCLID AVENUE • CLEVELAND, OH • 44106
PHONE: 216-844-7920 • FAX: 216-844-3106 • E-MAIL: ZXL11@CASE.EDU

The budget of $3 Million will be requested from the OTF fund for the first three years of the project with a match of ratio of 1:1 for cost share.

Sincerely,



Associate Professor, Radiology and Biomedical Engineering
and General Medical Sciences (Oncology, Pediatrics)
Case Center for Imaging Research

IPP 12-243

CASE WESTERN RESERVE UNIVERSITY
SCHOOL OF MEDICINE

University Hospitals
Case Medical Center

CASE CENTER FOR IMAGING RESEARCH

December 29, 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

***Re*: 2012 OTF IPP LOI**

To Whom It May Concern,

We plan to submit a proposal in response to your **2012 IPP RFP**. The Case Western Reserve University has been working with Athersys and other companies on cell labeling as a platform technology for imaging labeled progenitor cells during implant and transplant, mostly in the pre-clinical studies so far. We have demonstrated success in tracking these labeled cells in the animal models, and it is time to translate these results into clinical settings. Therefore, we propose to conduct a series of human studies using in vivo imaging as a platform investigate the bio-distribution, kinetics and dynamics of progenitor cells after transplantation and for correlation with clinical efficacy of novel cell-based therapies applied in several degenerative human disease. The title of this proposal is "In vivo imaging of progenitors in regenerative medicine". Until recently, most of the bio-distribution data of implanted/transplanted stem or progenitor cells were coming from pre-clinical studies. While these results are helpful in many aspects, they beg human studies to confirm many key findings. Conducting human studies is not a simple scale-up of small animal studies. We plan to examine all details in the platform, from cell-labeling strategy, to the choice of imaging modality, and most importantly, to the quantitative analysis of the acquired image data, for improvement to suit the proposed human studies. A team of investigators/collaborators are thus assembled to implement this.

From Case Western Reserve University (Lead Applicant)
PI: Zhenghong Lee, Ph.D.
The contact person for the Lead Applicant is *Michael Gilkey* at
National Center for Regenerative Medicine
10900 Euclid Avenue LC: 7284
Cleveland, Ohio 44106
meg14@case.edu
Ph: (216) 368-2079
Fax: (216) 368-6020

Our collaborators will be Athersys (Cleveland, Ohio), and potentially, Covidien (Cleveland, Ohio), Arteriocyte (Cleveland, Ohio).

ZHENGHONG LEE, PH.D.
ASSOCIATE PROFESSOR, CASE CENTER FOR IMAGING RESEARCH AND DEPARTMENT OF RADIOLOGY
NUCLEAR MEDICINE, RADIOLOGY, UNIVERSITY HOSPITALS CASE MEDICAL CENTER
11100 EUCLID AVENUE • CLEVELAND, OH • 44106
PHONE: 216-844-7920 • FAX: 216-844-3106 • E-MAIL: ZXL11@CASE.EDU

The budget of $3 Million will be requested from the OTF fund for the first three years of the project with a match of ratio of 1:1 for cost share.

Sincerely,

Associate Professor, Radiology and Biomedical Engineering
and General Medical Sciences (Oncology, Stem Cells)
Case Center for Imaging Research

IPP 12-244

December 28, 2011

Attention: Ohio Third Frontier
Ohio Department of Development
77 South High Street, P.O. Box 1001
Columbus, Ohio 43216-1001

Subject: "2012 IPP LOI" Ohio Third Frontier
Innovation Platform Program
Lead Applicant: National Composite Center
Program Title: **"Commercializing a Cross Industry Technology Platform of Low Cost Carbon Fiber"**

To Whom It May Concern:

The National Composite Center is please to provide this Letter of Intent to respond to the 2012 IPP Request for Proposal. The NCC and its collaborators will be providing a low cost solution/s in the development and commercialization of Carbon Fiber for composite and graphitic application. With the use of applied research platform technology in precursor feed stock chemistry and processing (including but not limited to coal, tar, bio-based and/or a various hybrid combinations) and implementation of new platform fiber processing technologies; the program will achieve a reduced costs of the overall fiber manufacturing processes resulting in a Low Cost Carbon Fiber. The carbon fiber pilot scale line will provide access to academia, industry and also military resources for research and development and pilot scale runs of known and new precursor to fiber processing technologies keeping Ohio as one of the leaders in carbon fiber technology developments in composite and graphitic applications. The program achievements will answer cross industry global demands for an alternative suppliers and market competition. Ohio will be the base in the exponential growth of the carbon fiber providers and end use applications in addition to providing continuous technology research in a pilot line scale environment.

Market indicators show that the limited accessibility to and capacity of carbon fiber is significantly chokes cross industry growth applications for use. Studies show that 98% of CF is a PAN related fiber (petroleum based) and of that, 98% are non US manufacturers. Market access to low cost carbon fiber suppliers would respond to the demand resulting in a supplier base increase by 10 fold.

Known Collaborators: University of Dayton, Airbus/EADS, Okuma Inc., and GrafTech International Holdings, Inc.

Funding and Cost Share: Total $3MM Grant Funds with $3MM Cash Match Funds

Sincerely,

Lisa A. Novelli – President and CEO
lnovelli@compositecenter.org
National Composites Center
2000 Composite Drive
Kettering, Ohio 45420
Phone: 937-297-9447

IPP 12-245

Cleveland Clinic

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
IPP2012@development.ohio.gov

28 Dec. 2011

Subject: 2012 IPP LOI

Lead Applicant's Name: Cleveland Clinic

Address: 9500 Euclid Ave, A41, Cleveland, OH 44195

Phone Number: 216-4444-7515

Contact Person: Dr. Wael Barsoum

Email Address for Contact Person: BarsouW@ccf.org

Proposed Project Title: Center for the Improvement of Orthopedic Surgical Accuracy (CIOSA)

Estimated State Funds to be Requested: $3,000,000

Known Collaborators: Astro Manufacturing, Custom Orthopedic Solutions

Summary of Project:

Inaccurately executed orthopedic surgical procedures cause billions of dollars in direct costs each year, and result in tremendous amounts of preventable patient suffering and lost productivity. For decades orthopedic companies and surgeons have invested heavily in trying to improve orthopedic surgical accuracy, but only in the last couple years have practical products with the potential to reduce this long standing problem started to reach the market. The adoption of these technologies has been slow, waiting for definitive demonstration of improved patient outcomes to drive changes in standard practices. Over the coming years, it is expected that the evidence of improved outcomes will be collected, which will lead to a rush of new technologies and products entering the orthopedic market.

The Center for the Improvement of Orthopedic Surgical Accuracy (CIOSA) is positioned to lead the coming paradigm shift in how orthopedic surgery is conducted. For more than 8 years the Cleveland Clinic has been conducting leading edge research to understand the root cause of orthopedic surgical inaccuracies, and has been developing technologies and products to improve orthopedic surgical outcomes. The CIOSA will provide and coordinate ongoing research and development efforts at Cleveland Clinic with local companies focused on commercializing these products into the orthopedic market, establishing northeast Ohio as the international leader in this market shift.

IPP 12-246

McKay, Michael J.

From: Keener, Timothy (keenertc) <KEENERTC@UCMAIL.UC.EDU>
Sent: Thursday, December 29, 2011 8:53 AM
To: OhioThirdFrontierRFP
Cc: 'Lusher, John (GE Infra, Aviation, US)'; 'Anne Isburgh (anne.isburgh@ge.com)'; 'mark.pearson@ge.com'; 'conley@TechSolve.org'; Montemagno, Carlo (montemcd); Keener, Timothy (keenertc)
Subject: 2012 IPP LOI

Re: Ohio Department of Development
Ohio Third Frontier
Innovation Platform Program (IPP)
Fiscal Year 2012
Request for Proposals (RFP)

TO WHOM IT MAY CONCERN:

Please accept this Letter of Intent (LOI) to submit a proposal to the above referenced RFP.

Lead Applicant's Name: University of Cincinnati Research Institute (UCRI)
Lead Applicant's Address: 5997 Center Hill Rd
Cincinnati OH 45224

Lead Applicant's Telephone Number: 513-556-2933

Lead Applicant's Contact Person: Dr. Carlo Montemagno
Dean, College of Engineering and Applied Science
Lead Applicant's Email: carlo.montemagno@uc.edu

Proposed Project Title: **Development of Manufacturing Methodologies for High Temperature Ceramic Matrix Composites (CMC's) for the Aerospace Industry**

Est. State Funds to be Requested: $3M

Known Collaborators: GE Aviation Engineering
1 Neumann Way
Cincinnati, Ohio, 45215

TechSolve
6705 Steger Dr.
Cincinnati, Ohio 45237

as turbine components and structures, engineers require a deep understanding and vast database of material properties for the material being used for the design. From the beginning, gas turbine engines have always used exotic metallic materials such as single crystal nickel- and cobalt-based superalloys in the hot section of the turbine engine. Typically, the hotter the engine was allowed to run, the better the performance. Gains in gas turbine efficiency have often been achieved by developing a new metallic material that would withstand increased operating temperatures. In the

past decade the industry has reached an entitlement regarding these high temperature metallic materials. To once again push the envelope on operating temperature, engineers at General Electric Aviation and UCRI have pioneered a new non-metallic material called Ceramic Matrix Composites (CMCs) that can withstand greater temperatures than current state-of-the-art metal alloys.

Currently, research efforts are underway to allow our engineers to design robust components made from these novel CMC high temperature materials by determining the fundamental CMC material properties that are needed to be determined and understood. Since these are non-metallic materials and different from other composites, traditional test methodologies cannot be used. New approaches are being developed and invented and verified to fully understand the CMC material. Also, traditional materials manufacturing methods are not appropriate for these composites as small variations in manufacturing conditions such as temperature, pressure, etc., can relegate an entire batch as unusable, which makes the manufacture and use of these materials problematic and potentially too expensive. **In support of these studies and with partial financial support from the IPP program, a CMC pilot production facility is proposed to be built at the University of Cincinnati Research Institute**, a Technology Development Innovation Platform located in Cincinnati, Ohio. The results of these ongoing fundamental studies will be tested and integrated into pilot production methodologies in order to determine the appropriate manufacturing conditions and approach. This project will focus on a commercialization opportunity capable of significant industry and economic impact.

UCRI is a mission--oriented, not-for-profit research institute working in close collaboration with the aerospace leaders in Ohio to develop the next generation jet engines and aerospace components.

Key Primary Scientific/Technical Field(s) Relevant to the Proposed Project: Advanced Materials related to advanced polymers, ceramics, composites, carbon fibers and nanotubes, and specialty metals and alloys.

Dr. Tim C. Keener, P.E., QEP
Special Assistant for Industry Outreach
Director, Air Quality Management/Air Pollution Control Program
Technical Editor-in-Chief
Journal of the Air & Waste Management Association
School of Energy, Environmental, Biological and Medical Engineering
College of Engineering
P.O. Box 210012
University of Cincinnati
Cincinnati, OH 45221-0012
Office Location: 701L ERC
Office: 513-556-3676
FAX: 513-556-4162
Tim.Keener@uc.edu
www.eng.uc.edu/~tkeener

"To have a good idea you must have a lot of ideas." Linus Pauling
"A man may die, nations may rise and fall, but an idea lives on." John F. Kennedy

Cleveland Clinic

January 3, 2012

Letter of Intent

Ohio Third Frontier Innovation Platform Program

To: **Technology and Innovation Division, The Ohio Department of Development**

IPP2012@development.ohio.gov

From: **Cleveland Clinic**

Subject: **Innovation Platform Program Letter of Intent**

Please accept this correspondence as an indication of our intention to submit a proposal for the 2012 Ohio Third Frontier Innovation Platform Program. As required, information regarding our proposal follows.

1. **Lead Applicant Information:**
   The Cleveland Clinic
   9500 Euclid Avenue, i20
   Cleveland, Ohio 44195
   Tel: 216-445-7176
   Fax: 216-445-2314

2. **Contact Person:**
   Neema Mayhugh, PhD, Director Commercial Affairs
   Cole Eye Institute, Cleveland Clinic Innovations
   Phone: 216-445-7176
   e-mail: mayhugn@ccf.org

3. **Proposed Project Title:**
   Ophthalmic Imaging Center (OIC)

4. **Estimated Grant Funds to Be Requested:**
   $3,000,000

5. **Known Collaborators:**
   OptoQuest Corporation, Image IQ, Farm Design, Avedro, Peregrine Instruments, Optos, Topcon

   Summary of Proposed Project: It is our intention to submit a proposal for the support of The Ophthalmic Imaging Center (OIC), a comprehensive, multi-disciplinary center for commercialization of ophthalmic imaging technologies. Ophthalmic imaging has been revolutionized in the last half decade through the introduction of innovative imaging modalities such as Optical Coherence Tomography (OCT). Previous to OCT, clinicians had only limited ability to image the eye through photography and crude ultrasonographic techniques. Now with the introduction of OCT, whole diagnostic and treatment paradigms are shifting to more precise and targeted methodologies. In fact, OCT imaging is now standard of care

for all patients with retinal disease and is fast becoming standard practice for diagnostic imaging of diseases of the front of the eye. Although ophthalmic imaging is now used in some form to investigate almost all diseases of the eye, this is particularly the case in management of the leading causes of blindness in Americans including age-related macular degeneration and diabetic retinal disease.

OptoQuest Corporation, the first spin-off of the OIC, is focused on the commercialization of front of the eye surgical imaging platforms. The company has developed an ultra-high speed OCT with elastography that allows surgeons for the first time to gain insight into the biomechanical properties of the eye prior to surgery. The OIC also encompasses a comprehensive surgical imaging program for the back of the eye, which will also for the first time allow surgeons to use image guidance during retinal procedures. These initiatives will lead to better outcomes, decreased costs and a growth in market opportunity as more patients are served with customized care.

We have identified multiple commercial collaborators that have committed to take the OIC's developed products through commercialization to revenue generation. These collaborators have also agreed to fund operations that will not only sustain, but also grow the employment base for ophthalmic imaging in the State of Ohio.

The Cleveland Clinic has a long proven commercialization track record. In addition, ophthalmic imaging is still at the early stages of innovation when compared to most other medical imaging areas and that translates to virtually unlimited opportunities in this space. Because of this and the fortunate concentration in Northeast Ohio of arguably the brightest and most dedicated research talent in ophthalmic imaging, we feel this Center will see a many fold return in number of commercialization dollars brought to the state as well as impact on employment base and global reputation as a leading area for medical imaging.

IPP 12-248

University Hospitals
Urology Institute

Department of Urology
Case Western Reserve University
University Hospitals of Case Medical Center
10900 Euclid Avenue, Cleveland, Ohio 44106

December 29, 2011

Ohio Third Frontier
Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, OH 43215-6130

Re: FY2012 Ohio Third Frontier Innovation Platform Program

Ohio Department of Development:

This letter is to state the intent of University Hospitals Case Medical Center, in conjunction with the partners listed below, to jointly produce and file a full proposal in response to the OTF Request for Proposal released on November 16, 2011.

1. Title: Female Pelvic Medicine Device Innovation Platform

2. Contact Person: Adonis Hijaz, MD
Associate Professor, Urology
Director, Center of Female Pelvic Medicine & Surgery
Case Western Reserve University
University Hospitals of Case Medical Center
216-844-3674
Adonis.hijaz@uhhospitals.org

3. Lead Organization: University Hospitals Case Medical Center

4. Legal Structure: Corporation for Non-Profit, State of Ohio

5. Estimated funds to be requested: $1.3 million

6. Collaborating Organizations:

US Endoscopy, Inc. (Mentor, Ohio)
Virtec Enterprises, LLC (Concord, Ohio)

We look forward to submitting a full project proposal to the Third Frontier program in February 2012.

Sincerely,
University Hospitals Case Medical Center

Adonis Hijaz, MD
Department of Urology

Female Pelvic Medicine Device Innovation Platform

For many women, vaginal childbirth, aging and other physical and disease stressors contribute to a significant weakening of the pelvic floor, the muscles and ligaments responsible for keeping pelvic organs in place. Reduced support for organs like the bladder, uterus, vagina, and rectum can interfere with normal body function and can seriously compromise a woman's quality of life.

UH Urology Institute's Female Pelvic Medicine & Surgery Center offers a personalized, multidisciplinary approach to help women navigate through the diagnosis and treatment of pelvic floor disorders. The center's team of highly specialized physicians works collaboratively to restore pelvic form and function in patients, applying some of the most innovative techniques available. Pelvic floor disorders include the loss of bladder and bowel control and the prolapse (dropping down) of female pelvic organs. Many patients find these conditions embarrassing or difficult to manage.

The University Hospital Case Medical Center will lead the Female Pelvic Medicine Device Innovation Platform meeting women's pelvic health needs. The team includes commercial collaborators to develop and commercialize new medical devices derived from the clinical needs identified by UHCMC. The long-term collaborations envisioned by the team will produce a series of medical device product lines involving products manufactured by Ohio companies and their suppliers. In essence this device innovation platform would allow pelvic floor surgeons to perform reconstructive procedures with precision that would introduce standardization to the methodology with which these procedures are performed.

IPP 12-249

Cleveland Clinic

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
IPP2012@development.ohio.gov

29 Dec. 2011

Lead Applicant's Name: Cleveland Clinic

Address: 9500 Euclid Ave,J4, Cleveland, OH 44195

Phone Number: 216-4444-5613

Contact Person: Dr. Douglas Johnston

Email Address for Contact Person: johnstd3@ccf.org

Proposed Project Title: Healthcare Information Technology Innovation Platform

Estimated State Funds to be Requested: $3,000,000

Known Collaborators: iVHR, others in discussion

Summary of Project:

Advent of electronic health records (EHRs) driven by the Department of Health and Human Services meaningful use requirements has resulted in tremendous changes in the way that patient related information is collected, stored, extracted, and utilized. While EHRs have the potential to improve patient care and to facilitate accurate data extraction, reporting, risk adjustment, and reimbursement, currently deployed technology essentially recapitulates the paper record in electronic form. In the current model, most patient data is recorded as individual data points without a means to ensure accuracy and consistency of the data. Patient medications, for example, may be recorded without the indication for which they were ordered. Clinical documentation relies heavily on free text either entered directly or dictated. This results in widespread inaccuracy and duplication of essential information. As a result, data for assessing risk adjusted clinical outcomes, predictive modeling and reimbursement are generally extracted manually by coding staff who are not related to the care of the patient and perform this task after the care is rendered. The staff necessary to perform this post hoc analysis cost the health care system billions of dollars per year, and the resulting data inaccuracies lead to inappropriate reimbursement patterns, inability to risk adjust outcomes, and missed opportunities to render appropriate care which puts patients at risk. In addition, providers have expressed profound dissatisfaction with current EMR technology and its ability to advance patient care.

The Heart and Vascular Institute at the Cleveland Clinic, the largest and highest acuity cardiac program in the US, has systematically examined the effect of medical record inefficiency and inaccuracy on patient care, reimbursement, and outcomes. Over the last 3 years the Cleveland Clinic has developed a number of technologies to evaluate and correct these inaccuracies, and to present accurate, more meaningful data from the EHR to providers. Predictive models leveraging this more refined clinical documentation have been developed which allow early identification of patients at risk for adverse events, and improved reimbursement based on more accurate risk adjusted patient outcomes. The Healthcare Information Technology Innovation Platform will provide a means to develop the software to allow for this technology to be deployed across disparate EHRs and will leverage the combined clinical expertise and software development capability of Northeast Ohio to commercialize this software for the multi-billion dollar healthcare IT market.

IPP 12-250

Cleveland Clinic

December 29, 2011

Letter of Intent
Ohio Third Frontier
Innovation Platform Program
Fiscal Year 2012

To: **Technology and Innovation Division, The Ohio Department of Development**

From: **Cleveland Clinic**

Subject: **Innovation Platform Program: Medical Technology, Implant Devices, Circulatory Support**

Please accept this correspondence as an indication of our intention to submit a proposal for the 2012 Innovation Platform Program to establish a collaboration supporting platform technology product development and commercialization of implantable medical devices for cardiac/circulatory support. As required, information regarding our proposal follows.

1. **Lead Applicant Information:**
   Cleveland Clinic
   9500 Euclid Avenue
   Cleveland, Ohio 44195
   Tel: 216-444-5757
   Fax: 216-445-6514
2. **Contact Person:**
   Joseph Barone
   Cleveland Clinic Innovations
   Phone: 216-445-8392
   e-mail: baronej2@ccf.org
3. **Proposed Project Title:**
   Miniaturized High Output Blood Pump
4. **Estimated Grant Funds to Be Requested:**
   $3,000,000
5. **Known Collaborators:**
   Perfusion Solutions, Inc.

6. Summary of Proposed Project:

Each year more than one million emergency hospitalizations are for acute and decompensated heart failure. This results in a staggering cost to the nation's healthcare system:

- 5.3 days mean hospital stay per event
- $33,635 mean charge per event for an aggregate $33.3 billion national cost

It is estimated that 100,000 Americans suffering from end-stage heart failure could benefit from suitable treatment options. Heart transplantations are available to only 2,200 of these patients annually. More recent advances in Left Ventricular Assist Devices (LVADs) have provided end stage heart failure patients with a treatment alternative. Originally developed to provide a temporary bridge to transplant, these devices have been refined to the point where they are now being considered for both short term cardiac support during high risk interventional procedures and as long term chronic support (destination therapy). Compared to the potential economic opportunity, market penetration remains low due to device related complications and cost. The proposed Perfusion Solutions pump is differentiated by its miniature size, design flexibility, high output and long durability.

While LVADs have been proven a more effective option over optimal medical therapy (drugs), size and invasiveness of the placement procedure limit the patient population to the severely ill who have run out of other options. Miniaturization of technology, pacemakers being a recent example, has driven market development and expansion. In the VAD field, smaller size enables less invasive procedures, which reduces rates of infections and supports faster patient recovery. Specific pump design features reduce risk of device related complications thereby providing the patient to a much improved quality of life. Along with cost effective production, the technology improvements will drive treatment adoption and drive market expansion. The proposed technology platform will yield an integrated product line of pumps filling the important niches for short and long term support in order to change the standard of treatment.

The Cleveland Clinic is the #1 rated heart hospital in America and operates the largest heart failure program in the country. Many of our clinical heart failure specialists are internationally prominent leaders. For over 20 years, the Cleveland Clinic has directly supported both research and development of circulatory assist devices through its Cardiac Assist and Replacement Lab and its Cardiovascular Dynamics Lab. Further, Ohio's long and proud history of manufacturing provides an ideal supplier base to support development and manufacturing of LVAD devices. Firms specializing in machining and treating medical implant materials, skilled engineers and machinists are found throughout the state. These factors provide for an ideal synergy within Ohio for the development and promotion of this unique platform.

IPP 12-251

THE UNIVERSITY OF TOLEDO
1872

December 28, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

This **Letter of Intent (LOI)** is provided by the University of Toledo in anticipation of a proposal for the FY 2012 Ohio Third Frontier **Innovation Platform Program** (IPP).

1. **Lead Applicant Contact**
   John P. Pigott, MD, FACS,
   Clinical Assistant Professor
   Dept of Surgery
   University of Toledo
   R-1 Incubator
   2600 Dorr Street
   Toledo, OH 43606
   (419) 291-2999
   jpigott@jvc.org

2. **Project Title**: The Flex Scoring Catheter

3. **State Funds Estimate**: $1,000,000 (Collaborators will commit $1,000,000 cash share)

4. **Collaborating Organizations**: VentureMed, LCC; Creganna-Tactx Medical; Rocket Ventures, ProMedica Health System

5. **Summary of Proposed Project** (see attached)

Sincerely,

James P. Trempe, Ph.D.
Vice President for Research
Professor, Biochem & Cancer Biol.

Research & Sponsored Programs – Main Campus
2801 W Bancroft Street
Mail Stop 944
Toledo, OH 43606-3390
419 530 2844 Phone
419 530 2841 Fax
ResearchAdmin MC@utoledo edu

Web site: research.utoledo.edu

Research & Sponsored Programs – Health Science Campus
3000 Arlington Avenue
Mail Stop 1020
Toledo, OH 43614-2595
419 383 4252 Phone
419 383.4262 Fax
ResearchAdmin HSC@utoledo edu

THE UNIVERSITY OF TOLEDO
1872

Summary of Proposed Project

The Flex Scoring Catheter (Flex) was designed and engineered for rapid commercialization within the OTF focus area of Medical Technology. The product involves the continued development, funding and commercialization of the Flex catheter developed by VentureMed, an Ohio based LLC, through the innovation platform of University of Toledo Research and Economic Development Department, and through the Academic Health Center, a partnership of University of Toledo and ProMedica, a regional health system. UT resources include a Technology Transfer and Commercialization program, including the UT animal lab, lab incubator, and assistance in submitting a 510K application to FDA. Together we will bring this product to market within a three-year time frame.

Rocket Ventures, one of six Ohio Third Frontier entrepreneurial signature programs, has provided early funding for the program, and will continue to consult with the project. The Flex comprises a new, simple and elegant vessel preparation and plaque modification device. It is an atherotomy catheter; essentially it embodies a custom cutter that allows the interventionalist to score custom length segments of plaque without the need for repeated balloon inflations. Prototypes have been developed with a large, worldwide medical device engineering firm (Creganna/TACTx) with an attention to a simple, cost effective design. Creganna has a Cleveland office and is interested in expanding its business into Ohio and agreed to be a partner.

The concept of plaque modification by controlled arterial incision is supported by the successful commercialization of three FDA cleared devices currently available in the marketplace. The Flex was designed to address the shortcomings of these devices. A single size catheter for the femoral popliteal segments eliminates the inventory control and stocking problems of similar devices. The device is intuitive to interventionalists, simplifies patient treatment and minimizes the hospital inventory issues.

Peripheral arterial disease (PAD) affects upwards of 12 million people in the U.S. including nearly 12% of the 50(+) age group. This reveals a large opportunity for PAD therapies. Current available scouring and cutting technologies [VascuTrak (CR Bond), Angioscupt (Angioscose), Cutting Balloon (Boston Scientific)] validate the clinical and market need to improve the results of standard balloon angioplasty. An area of opportunity for the Flex technology includes stenotic fistulae and grafts. Another large potential market would be for vessel preparation prior to the use of drug eluding balloons. A large opportunity exists by utilizing this device in tandem with drug eluting balloons. The $700 cost of the Flex should be very competitive compared to the costly atherectomy devices (>$3000). The Flex Scoring Catheter has intellectual property protection under a provisional patent application through the Toledo Law Firm of McMillan, Sobanski and Todd. Additional filings are being amended and a full patent application is being submitted upon achieving design freeze (December, 2011). The $1.2 billion U.S. market for interventional PAD devices (excluding peripheral vascular stents) is generated by the sale of various technologies. The most relevant product segments, PTA and atherectomy, currently contribute more than half of total revenues, or nearly $680 million in 2010. A key emerging segment, drug-eluting balloons, is expected to grow this core concentration of revenues to exceed $1 billion by 2013.

Research & Sponsored Programs – Main Campus
2801 W Bancroft Street
Mail Stop 944
Toledo, OH 43606-3390
419 530 2844 Phone
419 530 2841 Fax
ResearchAdmin MC@utoledo edu

Research & Sponsored Programs – Health Science Campus
3000 Arlington Avenue
Mail Stop 1020
Toledo, OH 43614-2595
419 383.4252 Phone
419 383 4262 Fax
ResearchAdmin.HSC@utoledo edu

Web site: research.utoledo.edu

IPP 12-252

Letter of Intent to Ohio Third Frontier Innova

Lead Applicant Name, Address & Phone	The Health Foundation of Greater Cincinnati 3805 Edwards Rd., Suite 500, Cincinnati, OH 45209-1948 513-458-6600
Contact & E-mail	Patricia O'Connor, Ph.D. 513-458-6620, oconnorp@healthfoundation.org
Proposed Project	Commercialization of Data Visualization and Analysis for Healthcare Providers
Estimated State Funds	$3,000,000
Known Collaborators	HealthBridge, Eagle Software Corporation; Anticipated Collaborators include GE Aviation, and others
Relevant Key Scientific Technical Field	Software Applications for Business & Healthcare

The Health Foundation of Greater Cincinnati is an Ohio-based nonprofit engaged in research and development through its wholly-owned subsidiary, Health Landscape. Our major collaborator is HealthBridge, an Ohio-based nonprofit providing Health Information Exchange (HIE). Both organizations are pioneers in their fields. Health Landscape has developed powerful, award-winning software that creates visual (primarily geographic) displays of health information at a fraction of the do-it-yourself cost. HealthBridge is one of the first and most successful HIEs, a prototype for other HIEs. They lead the vanguard of health informatics.

The two organizations wish to collaborate to create commercial products that integrate their core competencies and their well-developed platforms into new enterprises that meet commercial needs. HealthLandscape will add data visualization technology to HealthBridge's integrated electronic medical record and transactions processing technology. HealthBridge will augment its business analytics with the Health Foundation's scientific analytic capacity. Health Landscape will achieve sustainability through growing its customer base. Both organizations will move customers toward real-time applications, as opposed to using archived, post-hoc data. This allows customers to use results in the present to manage care, as opposed to looking to the past about what worked or didn't. This combination of patient-centered practice support, user-friendly visualization, and advanced analytics will support both provider practice and population-level health analysis.

Specifically, HealthLandscape will leverage its existing technology base to customize and sell its suite of data visualization and spatial analysis applications to end-users such as other HIEs across the country, and commercial companies such as General Electric. HealthBridge will leverage its technology base with Ohio-based Eagle Software Corporation's NARxCheck, to become their distribution mechanism to hospitals and ERs for real-time drug abuse identification and surveillance. Additional Ohio-based collaborators and end-users may be disclosed in the final proposal. For them, HealthBridge plans to create business intelligence analytics for large and small medical practices, using massive HIE-created databases to provide clinical management information and quality of care evidence; and Health Landscape plans to provide real-time health and safety surveillance and analysis.

This project will grow the health technology capacity of our region. The resulting commercial products and related services will be sold by Health Landscape, HealthBridge and NARxCheck. Jobs will be created in each of these organizations.

IPP 12-253

29 December 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

SUBJECT: Letter of Intent for 2012 Ohio Third Frontier Innovation Platform Program

Dear Sir or Madam:

The University of Dayton is pleased to submit this letter of intent for the 2012 Ohio Third Frontier Innovation Platform Program.

Lead Applicant: The University of Dayton
300 College Park
Dayton, OH 45469-0104

Administrative Contact: Claudette M. Groeber
Director, Contracts and Grants/Auth. Rep.
(937) 229-2919
claudette.groeber@udri.udayton.edu

Technical Contact: Khalid Lafdi, Ph.D. & D.Sc.
Wright Brothers Endowed Chair in Nanomaterials &
Professor, Chemical and Materials Engineering
(937) 229-4797
klafdi1@udayton.edu

Project Title: Commercializing a Cross Industry Technology Platform of Low Cost Carbon Fiber

Estimated Grant Funds to be Requested: $3,000,000

Collaborators: National Composite Center, Airbus/EADS, Okuma Inc., and GrafTech International Holdings, Inc.

Project Summary: The University of Dayton and its collaborators will be providing a low cost solution(s) in the development and commercialization of carbon fiber for composite and graphitic application. With the use of applied research platform technology in precursor feed stock chemistry and processing (including but not limited to coal, tar, bio-based and/or a various hybrid combinations) and implementation of new platform fiber processing technologies; the program will achieve a reduced cost(s) of the overall fiber manufacturing processes resulting in a low cost carbon fiber.

The carbon fiber pilot scale line will provide access to academia, industry and also military resources for research and development and pilot scale runs of known and new precursor to fiber processing technologies keeping Ohio as one of the leaders in carbon fiber technology developments in composite and graphitic applications. The program achievements will answer cross industry global demands for alternative suppliers and market competition. Ohio will be the base in the exponential growth of the carbon fiber providers and end use applications in addition to providing continuous technology research in a pilot line scale environment.

Market indicators show that the limited accessibility to and capacity of carbon fiber significantly chokes cross industry growth applications for use. Studies show that 98% of carbon fiber is a PAN related fiber (petroleum based) and of that, 98% of such fiber is not manufactured in the United States. Market access to low cost carbon fiber suppliers would respond to the demand resulting in a supplier base increase by 10 fold.

The University of Dayton looks forward to participating in this program to promote technology-based economic development within Ohio.

Sincerely,

Tony E. Saliba, Ph.D.
Dean, School of Engineering
Wilke Distinguished Professor

ts:adw

IPP 12-254

Ohio Third Frontier Innovation Platform Program

Letter of Intent

Lead Applicant:

The Ohio State University Office of Sponsored Programs
1960 Kenny Rd.
Columbus, OH 43210

Proposal Title:

Next Generation Multi-Modal Molecular Imaging Technology Platform

Budget Request (Estimated):

Capital:	$1,000,000
Operating:	$2,000,000
TOTAL:	**$3,000,000**

Contact OSU:

Michael V. Knopp, MD, PhD
The Ohio State University
Wright Center of Innovation in Biomedical Imaging
395 W. 12th Ave, Room 430
Columbus, OH 43210
Phone: 614-293-9998
Fax: 614-293-9275
Email: knopp.16@osu.edu

Collaborators:

Philips Healthcare Cleveland
Jeff Kaste, Director, CT-NM Program Management
595 Miner Rd, Cleveland, OH 44022
Office: 440-483-7283
E-mail: jeff.kaste@philips.com

Further collaborators are anticipated, however not yet finalized.

The partners have identified an opportunity to build upon each other's unique strength and focus on developing, validating and commercializing the next generation multi-modal imaging technology. Hybrid imaging to visualize and objectively assess in vivo functional and molecular processes has been the most successful growth and technology opportunity in the recent 5 years with PET/CT and SPECT/CT leading the innovation, new advanced imaging procedures in addition to commercial opportunities. We are proposing to team up using an integrated development to commercialize an innovative technology platform that combines best in class approaches such as using solid state instead of traditional analog technologies, merging disparate imaging technologies in advanced approaches and using imaging pharmaceuticals in specific ways to achieve improved, safer, more precise and better quantifiable imaging of physiological in vivo conditions, diseases and assessing biological effects of therapeutic approaches. The key primary technical and scientific fields will be: medical imaging using positron or gamma-emitting radiopharmaceuticals, computed tomographic imaging, magnetic resonance imaging, imaging technologies for healthcare.

IPP 12-255

THE UNIVERSITY OF TOLEDO 1872

Lead applicant: The University of Toledo

Principle investigator: Mohammad Elahinia, Ph.D.
MIME Department, Mail Stop 312
Toledo, OH 43606
Phone: (419) 530-8224
Email: mohammad.elahinia@utoledo.edu

Contact person: James P. Trempe, Ph.D.
Vice President, Research
Phone: (419) 530-2844
Email: James.Trempe@utoledo.edu

Other UT principle investigators: A. Agarwal, S. Ariss, C. Armstrong, S. Bhaduri, B. Cameron, C. Cooper, V. Goel, M. Hefzy, A. Nadarajh, and E. Parsai,

Project title: ***University of Toledo Medical Device Innovation Enterprise***

Estimated funding request: $3,000,000 for a 3-year period

Known collaborators:

1. Bionix Development Corporation (Ohio based – Toledo, OH)
2. Norman Noble, Inc. (Ohio based – Highland Heights, OH)
3. Thermomorph Devices (Ohio based – Toledo, OH)
4. Marshall-Kloene (Ohio based – Maumee, OH)
5. Wanna Life Wire (Will relocate to Ohio – Macon, GA)
6. Sorin Group (End-User – Minneapolis, MN)
7. Medtronics Cardiac Surgery Division (End-User – Minneapolis, MN)
8. Joimax (End-User – Germany)

THE UNIVERSITY OF TOLEDO
1872

Project Summary

This IPP project will primarily address the Medical Technology and Automation Technologies area and, in part, the Advanced Materials area.

The objective of the project is to address the technological needs of Ohio based companies in developing and commercializing medical devices. To this end, the project relies on an existing Innovation Platform (University of Toledo Medical Device Innovation Enterprise) comprised of unique technology capabilities and strengths in the area of manufacturing devices from smart materials such as shape memory alloys. Nitinol Commercialization Accelerator (NCA) as a previously funded Third Frontier Project provides access to unique talent, equipment, and facilities that will lead to further engagement between the industrial partners. NCA is the only Ohio University-based facility with capabilities, equipment, and technologies to process shape memory alloys for 3D medical devices. Partners at the NCA have established a track record in research commercialization and innovation, establishing intellectual property, licensing and forming start-up companies.

This proposal is to link the development and innovation capabilities and capacities of an already established Innovation Platform and all its resources at The University of Toledo to several late stage development and innovation needs of Ohio companies with potential to attract more companies to the state. These capabilities will lead to developing 5 new orthopedic and cardiovascular devices that will enter the market by year five of the grant. Additionally, this institute as an umbrella organization offers the following features 1) streamline medical device innovation to expedite the discovery-to-patient-use process, 2) attract large scale funding and projects to perform scientific, technical, and clinical research in the area of medical devices, 3) educate graduate and undergraduate students in the areas supporting research and development of medical devices, 4) contribute to economic development, revitalization, and growth of the region, 5) leverage the existing success and talents at UT to self-sustained research enterprise, 6) serve local economy by attracting and creating start-up companies to benefit from the expertise, facility, and innovation at the institute, and 7) attract top national talents to UT through a competitive fellowship in medical device innovation.

College of Engineering
Mechanical, Industrial and Manufacturing Engineering • Mail Stop 312 • 2801 W. Bancroft St. • Toledo, Ohio 43606-3390
mohammad..elahinia@utoledo.edu Email • 419.530.8224 Phone • 419.530.8206 Fax • http://smartsys.eng.utoledo.edu Web

IPP 12-256

CIFT Center for Innovative Food Technology

5555 Airport Highway, Suite 100 • Toledo, Ohio 43615-7320

December 29, 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

Attention: IPP

Subject: 2012 OTF Innovation Platform Program Letter of Intent

Please accept this letter of intent to submit a full proposal to the IPP. A brief summary of the proposed project along with the information specified in the request for proposals is provided.

Lead Applicant:	CIFT, Center for Innovative Food Technology
Address:	5555 Airport Highway, Suite 100
Phone number:	419.535.6000 x-106
Contact:	David Beck, CIFT President and CEO
Contact email:	dbeck@ciftinnovation.org

Project title: Commercialization of a Hand-Hygiene Sensing System for the Food Industry

Estimated State Funds to be requested: $3,000,000

Collaborators:	Bettcher Industries, Inc., Birmingham, OH
(Known)	Rockwell Automation, Inc.-Advanced Technology, Mayfield Hgts, OH

The two technology areas addressed by the proposed project are "Sensing and Automation Technologies" and "Software Applications for Business and Healthcare."

Thank you for the opportunity.

Sincerely,

David Beck
CIFT President and CEO

Project Summary: Commercialization of a Hand-Hygiene Sensing System for the Food Industry

Background and Rationale. In 1998, the U.S. Food and Drug Administration's (FDA) National Retail Food Team initiated a 10-year study to measure the occurrence of practices and behaviors commonly identified by the U.S. Centers for Disease Control and Prevention as contributing factors in foodborne illness outbreaks. In 1998, 2003, and 2008 compliance data were collected during visits by FDA personnel to roughly 850 foodservice and retail food establishments documenting those practices and behaviors. The final report, issued in October 2010 and entitled *FDA Trend Analysis Report on the Occurrence of Foodborne Illness Risk Factors in Selected Institutional Foodservice, Restaurants, and Retail Food Store Facility Types (1998-2008)*, documents that the risk factor Poor Personal Hygiene was typically a concern due to the lack of frequent and adequate hand washing. Improving hand-washing compliance, therefore, holds a significant opportunity for reducing a key risk factor associated with foodborne illness. An innovative sensing and automation platform using a novel hand soap detection system has been developed and promises to be a powerful tool in combating foodborne disease caused by poor food handler hygiene.

Furthermore, in December 2010, the U.S. Congress passed comprehensive food safety legislation entitled the *FDA Food Safety Modernization Act*, or FSMA, P.L. 111-353. Among its many provisions, FSMA creates new requirements for each owner, operator, or agent of a food facility to evaluate the hazards that could affect food manufactured, processed, packed, transported, or held there; to identify and implement preventive controls to significantly minimize, prevent, or eliminate such hazards; and to monitor and maintain records on these controls once they are in place. It further specifies the types of hazards that should be evaluated, and requires facilities to conduct a re-analysis at specified intervals, and to maintain at least two years of records to document and verify their control measures, among other details.

Project Description. An innovation sensing and automation platform has been designed and built to monitor, indicate, and document hand-washing compliance using a unique combination of sensors, adjustable range zone monitors, signal transmitters, soap dispensers and hand soap. A sensor, located in a hand wash detection station verifies the employee's hands have been washed and transmits a signal to the employee-worn electronic badge enabling the employee to enter zones requiring hand washing. When the employee exits the zone the badge is disabled requiring hand washing and re-enabling of the badge prior to re-entry. The badge can be programmed to generate an audible or visual "reminder" to prompt corrective action on-site and the system can also transmit a signal indicating a protocol breach to a remote site for documentation and administrative follow up. The system is novel in that its patented technology allows for the creation of several zones within a single room which will be a requirement in most quick service and full service restaurants.

Already, this technology has been successfully implemented in hospitals and skilled nursing facilities. The proposal team seeks funding from the State to reconfigure and validate this existing technology platform and design new appropriate software to meet the needs of the restaurant industry. The project will provide the sensing, data acquisition, analysis, validation, and reporting system and will include demonstrations and sustained beta-site operation within the restaurant environment.

Economic Impact. The State of Ohio is home to the headquarters of familiar regional, national, and international restaurant chains including Wendy's International, Inc. (Dublin), Bob Evans Farms, Inc. (Columbus), White Castle (Columbus), and Max & Erma's (Columbus). The hand-hygiene sensing system described can provide these and other Ohio foodservice businesses with the immediate, direct benefit of automatically monitoring and documenting protocol compliance for managers and public health regulators. As already shown in a healthcare environment, the system actually increases hand-hygiene compliance by reminding employees to comply and, therefore, will lead to a reduction in foodborne illnesses resulting from contamination by the unclean hands of food handlers. The food production and processing sectors present additional near-term commercialization opportunities of the same innovation platform, as Ohio's food manufacturers seek tools to assist in compliance with the FSMA requirements for implementation and documentation of preventive controls.

IPP 12-257

Letter of Intent for Case Western Reserve University

PI: Stanton Gerson, MD
Wolstein Research Building 2-501
10900 Euclid Avenue
Cleveland, OH 44106
216-368-1017
Contact Person: Michael Gilkey, MBA, MS
michael.gilkey@case.edu
216-368-2079

Title: Directed Gene Therapy Platform for human cells towards the development and clinical application of Cell therapies in the Ohio Medical Communities

Budget: $3,000,000

Collaborators: Lentigen, Cleveland Cord Blood Center, University Hospitals Case Medical Center; Cleveland Clinic, and Ben Venue Labs

Summary: This proposal will link two recent advances in gene therapy to develop a lentiviral vector (LV) carrying a drug resistance gene, P140K MGMT, for stem cell gene therapy applications.

The O6-methylguanine-DNA-methyltransferase (MGMT) gene is known as an effective method for hematopoietic progenitor/stem cell (HP/HSC) protection and selection by introducing a single point mutation of MGMT, P140K, that is resistant to the effects of benzylguanine (BG). A Phase I clinical trial using a oncoretroviral vector for the transfer of the MGMT gene into mobilized peripheral blood CD34 cells (mPB), has shown the safety of administering the MGMT gene. A STTR fast-track proposal is helping fund the commercial development of a selection system to improve stem cell therapies in a variety of malignant and nonmalignant diseases. In cancer, the goal is to protect stem cells and increase drug dose to the cancer. This process provides a means to increase the number of transduced stem cells to a level which could facilitate other gene therapy applications, including protection from HIV infection, correction of congenital and acquired genetic deficiencies and a selection system to improve stem cell therapies in a variety of malignant and non-malignant diseases. This is a platform technology.

There are two commercial products to be developed from this grant. The first will be a novel MGMT-based in vivo selection system to improve stem cell therapies. Clinical use of stem cell protection/selection approaches will lead to more robust hematopoiesis after chemotherapy as well as the opportunity to safely select for genetically altered stem cells over time. Stem cell selection technology in vivo will also allow for outpatient conditioning regimens for autologous and allogeneic HSC transplantation, thus leading to a safer treatment, especially for non-lethal conditions. This would make possible consideration of MGMT-mediated stem cell selection for a variety of congenital stem cell disorders, including hemoglobinopathies, and management of graft versus host disease.

A second product will be the ability to safely transduce stem cells with a therapeutic gene to treat disease or correct a gene that is responsible for a disease. This could lead to a cure for HIV, by protecting the HSCs from being infected, and other genetic diseases.

We anticipate that pharmaceutical, biotechnology, and other customers will be willing to license the system from CWRU/Lentigen for use in FDA approved human treatments.

IPP 12-258

Letter of Intent for Case Western Reserve University

PI: Stanton Gerson, MD
Wolstein Research Building 2-501
10900 Euclid Avenue
Cleveland, OH 44106
216-368-1017
Contact Person: Michael Gilkey, MBA, MS
michael.gilkey@case.edu
216-368-2079

Title: Cellular Manufacturing and Processing Platform to Enable Cellular Therapies in Ohio Medical Communities

Budget: $3,000,000
Collaborators: Athersys, BioSpherix, and Lonza
Academic: The Ohio State University, Cleveland Clinic, and University of Cincinnati

Summary: The Cell Therapy Integrated Service (CTIS), under the auspices of the National Center for Regenerative Medicine and the University Hospitals Case Medical Center, provides comprehensive support for cellular therapy trials initiated at UHCMC, CWRU, CC, and collaborating institutions. The goals of this proposal are to 1) expand the scope and capabilities of this facility to service hospitals across the entire State of Ohio interested in providing cellular therapies, 2) create a coordinated network of hospitals along the Medical Corridor pursuing cellular therapy clinical trials so that a centralized IRB and contracting system can be accessed by for-profit and non-profit institutions to accelerate their therapies to the clinic and bring cutting edge therapies to Ohioans, and 3) provide critical technologic scale-up manufacturing to convert existing institutional cell-based IP from early phase cell trials toward manufacturing efforts within the joint academic/commercial effort to bring robust cellular manufacturing capabilities to Ohio through partnership with Lonza and BioSpherix.

CTIS, created through a OTF investment, has the infrastructure to support investigators during the preclinical phase through clinical trial implementation. Support capabilities include assistance in the design and preparation of cells for GLP safety studies, navigation of the regulatory pathway, clinical protocol development, Investigational New Drug Application (IND) preparation through existing close interactions with FDA CBIR, sourcing of clinical grade supplies and reagents, scale up from research to clinical operations, including preparation of clinical therapy grade cells either through isolation or through culture expansion and gene transduction, and preparation of Standard Operating Procedures. CTIS currently offers 6 clean-room suites built to FDA specifications for cell manipulations and auxiliary applications such as cell cryopreservation, material management, cell product storage, waste disposal and HIPAA compliance. This infrastructure will be offered to networked institutions to increase the pipeline of cellular therapies.

Major Objectives:

- Become offsite location for cellular isolation and expansion protocols to enable Ohio institutions to perform outpatient infusions of novel therapeutics
- Create a centralized IRB, payment, and contract system where hospitals along the Medical Corridor contractually agree to having one point of entry to access each hospital
- Provide scale-up Cell Production Manufacturing Optimization Facility (CPMOF)
- Create new Roboticized Cellular Manufacturing Facility (RCMF)

IPP 12-259

AVETEC
ACCELERATING AMERICAN INNOVATION

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

December 29, 2011

Subject: *2012 IPP LOI*

To Whom it May Concern:

Advanced Virtual Engine Test Cell, Inc. (Avetec) is pleased to submit this letter as a Lead Applicant declaring our intent to submit a proposal to the Ohio Department of Development in response to the Innovation Platform Program.

Lead Applicant Contact Information:
James Mainord
4170 Allium Court
Springfield, OH 45505
jmainord@avetec.org
937-322-5000 ext. 2040

Known Collaborators:
SRI International, Inc.

Anticipated Funding Request:
$3 Million

Technology Areas:
Fuel Cells and Energy Storage
Software Applications for Business and Healthcare

Project Title:
Date Intensive Computing Environment and Commercialization Platform

Project Summary:
The high performance computing (HPC) and information technology (IT) community must discover new technologies and rapidly transform discoveries into validated, trusted high-value end products and services. But in the real environment, it's not enough for a product manufacturer to say a product or technology works and meets specifications. In reality, customers and end users want validated evidence that products and technologies meet promised standards and specifications. It is critical that products and emerging technologies function correctly and consistently to ensure success in the marketplace, while enhancing business value for the end user. Independent testing by a vendor-neutral, realistic test environment is a cost-effective and credible way to ensure the part, component and system solution work. Based on research conducted by Avetec, software and hardware defects realized in the production environment can cost much more to fix then if they were found during testing.

In this proposal, Avetec will seek to assist data centers in proper energy management as well as commercial developers and IP holders in enhancing their product for commercial readiness. This will be accomplished by utilizing and upgrading its existing high-performance computing environment in conjunction with the commercialization processes developed by SRI International.

Thank you for your consideration.

James Mainord
Avetec In-House Counsel

IPP 12-260

12/28/11

Dear Ohio Department of Development,

Please accept this Letter of Intent (LOI) from Case Western Reserve University (CWRU) for our 2012 Innovation Platform Program proposal.

Lead Applicant's Name:	Case Western Reserve University (CWRU)
Address:	10900 Euclid Avenue Cleveland, Ohio 44106
Telephone:	(216) 368-0748
Contact Person:	Dr. Gregory S. Lee
Contact Email:	gregory.s.lee@case.edu
Proposed Project Title:	Distributed Generation & Intelligent Microgrid Center
Estimated Grant Funds to be Requested:	$3 Million
Known Collaborators:	Parker Hannifin Corporation, TBD

Project Summary

Technologies for addressing our transforming energy production and distribution requirements are available now. However, these technologies exist only as discrete products. Such separation prevents them from addressing more than the distinct needs for which they were developed, including the potentially significant contribution they could make as a system. Numerous Ohio businesses produce elements that may be combined to build transformative energy systems, taking the form of distributed generation plants and intelligent microgrids. Developing such energy systems, however, requires pursuing system design based on scientific principles and comprehensive measurement and testing.

Case Western Reserve University (CWRU) and its industrial partners seek to address this challenge by creating the Distributed Generation and Intelligent Microgrid Center (DGIMC). The DGIMC will provide a unifying facility for the development of distributed generation systems, complete with combined heat and power (CHP) integration and the capability of interconnecting with other similar systems and the main electrical grid as stand-alone, intelligent microgrids. Because of the large number of elements required for such a system, adequate facilities appropriate for this development rarely exist in the private domain. However, at CWRU, the DGIMC will combine and coordinate the efforts of multiple existing energy research groups and physical assets (fuel cells, combined heat and power, smart grid, business and policy development) under one larger and collaborative entity. Together, these established capabilities would focus on combining scientific discovery with commercial development. This new entity will further provide facilities for testing the integration of distributed generation, microgrid intelligence, and interconnection elements currently offered by Ohio companies as individual products. Such a facility will provide Ohio companies with competitive advantage, as well as establish Ohio as the intellectual and technological leader in the short and long term.

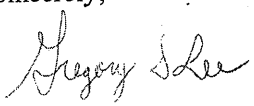
The initial project of the DGIMC will be to combine several existing energy elements produced by Ohio companies in order to establish a collaborative distributed generation system with microgrid capabilities. To enable this work, the project will draw on the key primary/scientific fields of Electrical Engineering, Systems and Control Engineering, Computer Science, Materials Engineering and the Weatherhead School of Management, all of which are areas of expertise at CWRU. Specifically, the project will build on knowledge in fuel cell, photovoltaic, energy storage, and wind turbine applications established in renowned CWRU centers and institutes, including the Swagelok Center for Surface Analysis of Materials, the Solar-Durability and Lifetime Extension Center, the Wind Energy and Research Commercialization

Center, and the Great Lakes Energy Institute. Although the short term focus of DGIMC will be the demonstration, validation, and commercialization of specific industry partner products within the distributed generation/microgrid system, the future use of the DGIMC will be to assist many more Ohio companies in commercializing a comprehensive spectrum of derivative products.

Initial partners in this Innovation Platform Program project will be Ohio companies with existing products suitable for use as specific elements in distributed generation microgrids, as well as companies with products under active development and intended for next generation energy products. CWRU will further use the DGIMC to engage numerous Ohio-based industrial partners to commercialize a distributed generation and intelligent microgrid product as a complete system and to provide services crucial to producing industry leading products in this space. CWRU is establishing partnerships with Ohio companies that would benefit from such services. One current committed partner is Parker Hannifin of Cleveland, OH. Parker is the nation's largest producer of inverters and also produces numerous battery management systems as well as novel energy generation technologies.

If successful, this Innovation Platform Program will leverage the considerable investment Ohio has made in energy, including existing facilities and capacity in photovoltaics, wind, and fuel cells at CWRU. Ohio companies can further leverage this investment to innovate and increase competitiveness in the global market for distributed generation and intelligent microgrids, which is rapidly growing. The end result of both will be sustained industry engagement, leadership and job creation benefiting all Ohioans.

Sincerely,



Gregory S. Lee, Ph.D.
Research Assistant Professor
Electrical Engineering and Computer Science

IPP 12-261

LETTER OF INTENT

Ohio Third Frontier Innovation Platform Program

Lead Applicant: The University of Akron

Address: Goodyear Polymer Science Bldg, 170 University Circle, Akron, Ohio 44325

Phone Number: 330 972 6949

Contact Person: Prof. Darrell Reneker (reneker@uakron.edu)

Project Title: Nano -to - Micro Gap Carbon Fibers

Estimated Funds Required $2,000,000 to be expended over a three year period

Known Collaborators

+**NanoSperse**: Producer of Nanocomposites for Aerospace Applications, President Art Fritt, Kettering Ohio

+**PolyOne**: Specialty Thermoplastics Polymer Materials, Avon Lake, Ohio

Renegade Materials Corp: High performance composite, prepreg, and adhesive materials, Springboro, Ohio

+**Ovation Polymers**: Electrically and Thermally Conductive Polymer Compounds, Medina, Ohio

+**Oak Ridge National Laboratories**: Material Science and Technology Division, Oak Ridge Tenn.

+**NASA Glenn**: Battery Technology Division, Cleveland, Ohio

+**NGJ, LLC** : Supplier of Carbon Fibers, Akron, Ohio

+**GrafTech**: Supplier of Mesophase Pitch, Cleveland, Ohio

SUMMARY OF PROPOSED PROJECT

Nano – to Micro Gap Carbon Fibers

PROJECT SUMMARY

Closing the Nano-to-Micro Diameter Gap in the Supply of Carbon Fibers

A nanometer to micrometer scale gap, in the available diameters of thin carbon fibers, lies between multiwall carbon nanotubes and carbon microfibers. A patent protected gas jet process, referred to as the NGJ process, for the manufacture of carbon fibers with diameters that span this range is being researched. Fibers of mesophase pitch, with diameters that span this nano--micro gap are produced as a hot gas flows at a high velocity over the surface of a molten layer of mesophase pitch. Thermal treatment of the fibers converts the aligned pitch molecules to carbonized or graphitized fibers, referred to as gas jet fibers (GJF). The graphitized fibers contain aligned graphene-like sheets or ribbons. The NGJ process scales in a straightforward way to high production rates. The mass production costs are estimated to be significantly lower than for alternative methods.

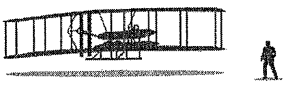
The proposed work leads to new product designs manufactured with carbonized and/or graphitized fibers in the GJF diameter range. The investigators on this proposal bring expert knowledge of fiber production, well equipped laboratories, process modeling and control together with expert knowledge of contemporary important developments such as anodes for lithium batteries, advanced filtration of gases and separation of liquids, roll to roll manufacturing of electronic devices on polymer films, and composite parts for aerospace applications. Each of these investigators recognizes opportunities for the use of GJF fibers with diameters in the nano to micro gap range, to manufacture improved structures and devices in their area of expertise. Opportunities for synergism abound.

A spin-off company of the University of Akron Research Foundation, NGJ LLC, was established. A SBIR grant from NSF was used to build a fiber production facility that has produced a quantity of GJF fibers. NGJ LLC, presently the only known manufacturer of carbon fibers with diameters that span the Nano-to-Micro gap, will make characterized fibers available at no cost to this project.

BROADER IMPACTS RESULTING FROM THE PROPOSED ACTIVITY

The development of the GJF carbon nanofibers improve products and create jobs in many industries. Better electrodes and membranes for batteries and fuel cells are needed in the transportation industry. The improved strength and resistance to crack growth in fiber reinforced composites will be valuable in the construction of lightweight, power efficient transportation vehicles. The electrical conductivity, chemical inertness, mechanical strength and temperature resistance of carbon nanofibers will be valuable as supports for catalysts and enzymes, as well as filtration membranes. The conduction of electrons through flexible sheets of "printed" light emitting diodes and solar energy converters will enable new, economical and durable designs. Each application of GJF fibers presents intellectually challenging opportunities for materials engineering and materials science developments

IPP 12-262



WRIGHT STATE
UNIVERSITY

Dept. Computer Science and Engineering
3640 Colonel Glenn Highway
Dayton, OH 45435
937/775-5131
937/775-5133 Fax
cse-dept@cs.wright.edu

LOI for OTF Innovation Platform Program FY2012

Date:	Thursday, Dec. 29, 2011
Administrative Contact:	John Mackay, Business Development Officer Wright State University College of Engineering & Computer Science 3640 Colonel Glenn Highway Dayton, OH 45435 Office: 937-775-5257 Email: john.mackay@wright.edu
Technical Contact:	Arthur Goshtasby, Professor Wright State University Department of Computer Science and Engineering 303 Russ Engineering Center Dayton, OH 45435 Office: 937-775-5170 Email: arthur.goshtasby@wright.edu
Subject:	"2012 IPP LOI"
Submitted To:	IPP2012@development.ohio.gov
Project Title:	Medical Image Analysis Software for FMI PET/CT Scanners
Estimated Grant Funds:	$1 million
Collaborating TEAM:	Arthur Goshtasby (Ph.D.), Wright State University (PI) Martin Satter (Ph.D.), Kettering Medical Center (Co-PI)
Industrial Partners:	Fused Medical Imaging (FMI) Technologies, Akron, Ohio Image Registration and Fusion Systems, Beavercreek, Ohio

Project Summary:

Wright State University (WSU) in close collaboration with Kettering Medical Center (KMC) has been developing user interfaces for the PET/CT scanners currently under development at FMI Technologies, Akron, Ohio. The company already has customers in China and elsewhere for its scanners. Attempts are underway to obtain FDA approval for distribution of the scanners within the U.S. also. The company has chosen WSU as one of its software development sites.

At the present, WSU has a contract to develop user interfaces for the FMI PET/CT scanners. This proposal is to extend the current contract with FMI and develop image analysis methodologies and software for various applications. Specifically, this project will develop state-of-the-art image registration and image segmentation software for the scanners.

Image registration enables precision alignment of PET/CT volumes taken of a patient in a visit, and PET/CT volumes acquired serially at different visits of a patient. Image segmentation enables delineation of ventricular walls in CT volumes and extraction of arteries in CTA volumes. These tools enable evaluation of cardiac performance for diagnosis and treatment planning.

The current contract to develop user interfaces for PET/CT scanners will expire on Aug. 31, 2012. This proposal is to extend the current contract for three more years, developing image registration and image segmentation methodologies and software. During this project period, methodologies and software to 1) elastically register PET/CT volumes of a patient taken sequentially, 2) elastically register PET/PET and CT/CT volumes of a patient taken serially, 3) segment CT volumes to extract cardiac chambers at different phases of the cardiac cycle, 3) extract the arterial tree in CTA volumes, 4) quantify various cardiac indices from segmented CT and CTA volumes for diagnosis and treatment planning, and 5) evaluate the registration and segmentation methodologies and software.

The team at WSU will include the principal investigator (Arthur Goshtasby), two Ph.D. students, two M.S. students, and two B.S. students. The investigator at KMC (Martin Satter) will be a consultant to the WSU team, providing the medical expertise needed to design and evaluate the various software systems. In addition, the WSU team will have access to a vast array of image registration tools developed throughout the years by Image Registration and Fusion Systems, an Ohio company. In return, Image Registration and Fusion Systems will be given the rights to commercialize the developed registration and segmentation software beyond uses by FMI Technologies.

Annual direct and indirect costs is estimated to be about $300K with total project cost of about $1M.

This project will not only help FMI Technologies to manufacture and market its PET/CT scanners, it will create the opportunity to commercialize the developed software beyond the needs of FMI Technologies, making the developed methodologies and software available to other users of PET/CT scanners in hospitals and medical centers in Ohio and elsewhere.

IPP 12-263

Letter of Intent

Lead Applicant: The University of Akron

Address: The University of Akron, 302 Buchtel Common, Akron, OH 44325-3904

Phone Number: 330-972-6764 (Office of Research Services and Sponsored Programs)

Contact Person: Jose Alexis De Abreu-Garcia (alexis4@uakron.edu); 330-972-6709

Proposed Project Title: **Development of Superhydrophobic Surfaces for Emerging Applications**

Estimated State Funds to be Requested: $3,000,000

Collaborators:

Delphi Packard Electric. Warren, OH

Lubrizol Advanced Materials, Inc. Cleveland, OH

Ross Nanotechnologies, LLC. Leola, PA

Aging Aircraft Consulting LLC. Warner Robins, GA

Northeast Ohio Medical University (NEOMED). Rootstown, OH

Project Summary

The U.S. Department of Energy has set goals to develop and commercialize highly-functional, transformational materials with breakthrough benefits to energy generation, transmission systems, manufacturing energy efficiency, infrastructure maintenance and support the development of new products in emerging industries. U.S. National Institutes of Health is directing research to advance medical intervention technology and reduce hospital acquired infections by investigating new anti-infective strategy to reduce adhesion-mediated virulence. These strategies are all relying on advanced engineered tunable surfaces that give self-cleaning, high performance electrical isolative or conductive, anti-corrosive, bio-film repellant or controlled biological tissue attractive engineered material surfaces. ("Superhydrophobic Surfaces and emerging applications: Non-adhesion, energy, green engineering", **Current Opinion in Colloid & Interface Science** Volume 14, Issue 4, August 2009, Pages 270-280)

The proposed research deals with the creation and application of highly durable superhydrophobic (SH) and superoleophobic (OP) *engineered surfaces that can be applied via polymeric binders at ambient temperature and pressures on a broad range of substrates* including: metals, ceramics, glass, plastics, rubber, fabric and paper. These highly functional SH and OP surfaces can deliver a multitude of properties including: non wetting in water and oils; non wetting in salt water and other aqueous solutions of acids and alkalis; corrosion resistance and performance exceeding that obtained by hexavalent chromium based solutions; non dirt/mud sticking; self-cleaning or low energy cleaning; non staining; icing resistance; and bacterial growth resistance.

This 3-year project will focus on three applications with highest probability of success and in close collaboration with our medical and industrial partners:

- Application of the proposed technology to **electric motors** working in harsh environments such as mining, pulp and paper, steel and other metals industry and energy producing systems such as wiring harnesses (Delphi Packard Electric), wind turbines, and conventional power plants.
- The second application will deal with **corrosion mitigation** for a range of applications industrial metal surfaces from gears, electrical, aerospace to biomedical. Our collaborators will explore mechanical materials in transportation (automotive and aerospace) to infrastructure, corrosion under insulation for piping used in chemical and petroleum industries. One example is to reduce friction during wet conditions and also under normal operations by keeping the gears or turbine blades clean from surface self-cleaning action.
- The next application will be for **biomedical device bio-fouling prevention**, where University of Akron Polymer Engineering and NEOMED collaborators will develop the key data on performance of engineered surfaces for medical device needs from orthopedics to synthetic scaffolds for bio-engineering. Commercial biopolymer commercialization interest at Lubrizol Advanced Materials, Inc.

Materials development by the University of Akron (UA) advanced materials engineering researchers in collaboration with our industry and medical partners, if validated from the above research and development, will become engineered products that solve the performance needs for today and tomorrow's high performance industries in Ohio and globally.

IPP 12-264

December 29, 2011

Ohio Department of Development
Third Frontier Program
Innovation Platform Program
IPP2012@development.ohio.gov

RE: Letter of Intent to file application

Please allow this to serve as our letter of intent to file an application for funding under the Innovation Platform Program RFP listed on November 16, 2011.

Lead Applicant: Northwest State Community College
22600 State Route 34
Archbold, Ohio 43502
PH; 419-267-5511

Contact Person: Melissa J. Rupp. Director of Grants Development and Administration
Phone: 419-267-1335
Email: mrupp@northweststate.edu

Proposed Project Title: Flex Fuel and Skip Fire Chip Manufacturing and Commercialization

Estimated State Funds Requested: $2 Million ($4 million project)
(Private matching funds provided by collaborators)

Collaborators:

1. HP2g, LLC An Ohio Energy Technology Company	2611 N. Scott Street, Napoleon, Ohio 43545
2. Cross Roads Transportation	14620 Co. Rd I, Bryan, Ohio 43506

Project Summary:

Northwest State Community College has worked in conjunction with collaborators to develop computer chip energy technologies. One technology automatically converts any 1996 or newer vehicle into a flex fuel vehicle capable of running on ethanol fuel or gasoline at the driver's discretion. This technology will ensure that public and private sector vehicle fleets will meet and surpass all EPA and Executive Order requirements for emissions and petroleum fuel use reduction at a vastly lesser price than full vehicle conversions or full purchase of a flex fuel vehicle. The other technology provides variable displacement cylinder operation in diesel vehicles, allowing semi trucks, product delivery fleets, mass transit busses and ambulances to increase fuel economy by 65% to 100% (depending on the vehicle) and cut fuel usage and costs in half. Such reductions in shipping costs will have great positive effect on the transportation industry and beyond.

Prototypes have been built and tested. The two products are commercialization ready with end users in place. Collaborator 1 will create immediate job openings in Ohio upon commencement of manufacturing. Lead Applicant will be partnering with the collaborators to bring the products to commercialization and will be requesting funding for operations, equipment and facility costs to:

- conduct independent scientific review of the products;
- perfect manufacturing techniques and operations; and
- Open commercialization of the products.

We believe that these products both address one or more of the technology areas contemplated by this funding announcement.

Thank you for the consideration of this letter.
Sincerely,

Melissa J. Rupp, M Ed
Director of Grants Development and Administration
Northwest State Community College

IPP 12-265

Summa Cardiovascular Institute

Marc S. Penn, MD, PhD, FACC
Director of Research

Professor of Medicine and Integrated Medical Sciences
Northeast Ohio Medical University

Office: 216/835-8503
Fax: 866/299-7071

E-mail: mpenn2@neomed.edu

December 29, 2011

2012 Innovation Program Platform - Letter of Intent

Lead Organization:	Summa Health System
Address:	Summa Cardiovascular Institute
	525 E. Market St.
	Akron, OH 44309
Contact	Marc S. Penn, M.D., Ph.D.,

This Letter of Intent confirms that we will submit a proposal entitled "Novel Regenerative Therapies for Treatment of Cardiovascular Disease", requesting approximately $3,000,000 in response to Innovation Program Platform (IPP) RFP. In collaboration with Athersys, Inc. and Juventas Therapeutics, Inc. we propose to develop novel cardiovascular regenerative therapies that will strengthen the pipelines of two leading Ohio-based biotechnology companies.

For more than 12 years, our laboratory has developed a platform that allows for us to effectively discover and develop novel regenerative therapies. The work from our team has resulted in the creation of two clinical-stage, venture-backed, Ohio-based regenerative medicine companies (Juventas Therapeutics and SironRX Therapeutics) and supported product development for Athersys Inc, a Cleveland-based biotechnology company developing a novel stem cell based therapy for treatment following a heart attack.

Through this proposal, we will strengthen our links with these two companies through accessing our regenerative medicine discovery and development platform to fill their pipeline with at least 3 new products that they can commercialize within the proposed project period.

Sincerely,

Marc S. Penn, MD, PhD, FACC

IPP 12-266

TBEIC Tech Belt Energy Innovation Center

December 27, 2011

Please accept this letter of intent for the Tech Belt Energy Innovation Center's proposal to the 2012 State of Ohio Third Frontier Innovation Platform Program.

Proposed Project title:	Energy Storage Grid Integration Platform
Estimated requested grant:	$2,000,000
Expected Collaborators:	Beckett Energy Systems, Inc., Rockwell Automation, FirstEnergy Solutions Corp., AEP Ohio, Inc.
Other Potential Technical Support Entities:	Case Western Reserve University, University of Akron, The Ohio State University, Youngstown State University, NASA Glenn Research Center, Electric Power Research Institute (EPRI), The National Energy Technologies Laboratory (NETL), Sandia National Labs

Summary of the Proposed Project: The projects proposed will support the development and sustained use of the Tech Belt Energy Innovation Center Energy Storage Grid Integration Platform (TBEIC Platform). The specific , collaborative project proposed will result in commercialization of a Beckett Energy Systems commercial three-phase, edge-of-grid storage solution to address peak load management and grid stabilization issues for commercial industrial users and utility / grid managers.

Funding for this proposal will develop integration and management technologies needed for commercialization of the Beckett Energy Systems storage product proposed and for future products planned by Beckett and other project participants. The result will connect Beckett and other grid-level storage projects to an array of simulation, modeling, testing and evaluation resources, both at TBEIC and through technical partners in our grid connectivity innovation platform network. Part of this network will include TBEIC's test-bed and proving ground for grid-level energy storage devices and systems designed for connection to the U.S. power grid.

Grid integration, management and connectivity are major obstacles to the commercialization of grid-level storage systems. The TBEIC Platform proposal will provide direct tools, technical assistance and validated "voice of the customer" requirements to facilitate easier commercialization of storage systems from Beckett Energy Systems and others. TBEIC enables easy access to a broad based Innovation Platform of Ohio and national grid-connectivity resources which speeds the commercialization process for energy storage systems from Ohio manufacturers and entrepreneurs. Key infrastructure will include a multiprotocol communications-enabled interface to the grid, inversion and frequency modulation equipment necessary to accommodate a range of applications, as well as test stands and related industrial infrastructure necessary to demonstrate, assess and troubleshoot emerging energy technologies. This will augment TBEIC's established industry support network of technical and business advisors, corporate partners and research lab collaborators.

About TBEIC

Funded by the US Department of Energy, The Tech Belt Energy Innovation Center (TBEIC) is a non-profit corporation charged with the mission of commercializing advanced energy and energy efficient technologies. Within its downtown Warren, Ohio location, the TBEIC Platform will provide infrastructure and technical staff necessary to develop fully integrated grid-level energy storage systems, demand-response systems, distributed power generation and control environments.

Lead Applicant and contact:

Chris Mather
The Tech Belt Energy Innovation Center
108 Main Avenue, SW Suite 1005
Warren, OH 44481-1058
chris@tbeic.org (440) 221-6280

Sincerely,

Chris Mather
Chief Executive, National Initiatives

David Nestic
Chief Executive, Regional Operations

IPP 12-267

College of Science and Engineering
Office of the Dean

December 29, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
IPP2012@development.ohio.gov

SUBJECT: 2012 IPP LOI

Dear Sir or Madam:
The Central State University is pleased to submit this Letter of Intent for the Fiscal Year 2012 Innovation Platform Program request for Proposal. Information for this project is as follows:

***Prospective Lead Applicant*:** Central State University

Address and Contact Person:
Dr. Subramania I. Sritharan P.E.
Interim Dean, College of Science and Engineering
117, CENS Building
Central State University
1400 Brush Row Road
Wilberforce, OH 45440

Project Title: Sensors for Automated Chemical - Free Green Space Management

Estimated grant funds: $1,000,000

Known collaborators:

- Global Neighbor, Inc; an Ohio company whose role is lead commercialization company
- University of Dayton: Dr. Joseph W. Haus, Director and Professor (Lead Researcher, sensors and sensor integration), Dr. Vijayan K. Asari, PhD, Ohio Research Scholars Endowed Chair in Wide Area Surveillance and Professor in Electrical and Computer Engineering.
- National Environmental Technology Incubator (NET) at Central State University: Commercialization and strategy of near term market implementation

- EMTEC: Technology and product strategies development.

Potential collaborators: Koenig Equipment and Proctor and Gamble: For product commercialization - marketing and distribution.

Summary of the Proposed Project:
The Team will develop a commercial grade low-cost variation of military sensor technology applied to target delivery of environmentally benign weed management mechanics for multiple markets: residential, agricultural, nursery, and green-space management (gardens, parks, etc.). By applying this platform with the previous work by Central State University and Global Neighbor Inc., GNI will first commercialize environmentally benign weed management products. Our project will be able to serve many markets while improving environmental conditions and we will target our first introduction into the residential market that GNI already serves.

The project targets a portion of the pollution problem by reducing the need for "weed-n-feed" type chemicals for residential market, chemical herbicides used in agriculture market and used in horticultural markets. We deliver a more convenient environmentally sound solution. Why target the residential market first? Lawn turf is America's biggest crop and a mixed bag for our habitats. Homeowners tend to apply fertilizers and herbicides at several-fold the recommended levels. (*US News and World Reports May 5, 2005*) As we become more sensitive to potential danger to health and wildlife, consumers seek less harmful alternatives to the millions of pounds of chemicals applied to their lawns that seep into watersheds yearly.

The R&D is advanced and aims at augmenting features to existing technology products used in lawn and landscaping markets. Specifically, the team will introduce our weed management tool into an existing mower so that the weed-n-feed function can be done without any additional effort to the user.

Central State University looks forward to participating in this program to promote technology based economic development and job creation within Ohio.

Sincerely,

S. Sritharan

Subramania I. Sritharan PhD, PE.
Interim Dean

IPP 12-268

STARK STATE COLLEGE

Changing Lives ... Building Futures

Date: December 28, 2011

To: Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
IPP2012@development.ohio.gov

From: Stark State College of Technology
6200 Frank Avenue NW
North Canton, OH 44720

Subject: 2012 Innovation Platform Program Letter of Intent

Lead Applicant: Stark State College of Technology

Contact Person: Caroline Maloney
Interim Business Processes Manager
(330) 494-6170, ext 4764
cmaloney@starkstate.edu

Project Title: Emergency Services / Fire Safety Training and Testing Center

Grant Funds to be Requested: $2,000,000 OTF

Collaborators:

Marathon Petroleum Company
2224 Gambrinus Ave. SW
Canton, OH 44706
(330) 479-7037
Contact: John Gross
jgross@marathonpetroleum.com

Will-Burt Company
169 S. Main St.
Orrville, Ohio USA 44667
(330) 684-5319
Contact: Anatol Kwartler
akwartler@willburt.com

Therm-Equip, Inc.
3805 Maplewood Avenue SW
Canton, OH 44706-4862
(330) 484-5384
Contact: Cheryl Petrovic
cheryl_petrovic@sbcglobal.net

Power Wash Systems, Inc.
1681 Meadowlane Drive SE
North Canton, OH 44709-1168
(330) 284-2485
Contact: James Piero
jpiero@neo.rr.com

Project Summary: See attachment

Respectfully Submitted,

Caroline Maloney

L. Caroline Maloney
Interim Business Processes Manager
Stark State College

Emergency Services / Fire Safety Training and Testing Center
Project Summary

Most emergency response and fire teams today not only handles most aspects of public safety (beyond law enforcement security issues), but also promote innovation and advances in emergency medical care, emergency service technologies and many public health needs such as preparations for pandemics, disasters, industrial accidents and weapons of mass effect. Of the 200 largest cities in the United States, 97% have fire service-based emergency medical services with the fire service team providing advanced life support (ALS) response and care in 90% of the 30 most populated U.S. jurisdictions (cities and counties) . Fire service-based emergency medical services (EMS) systems are strategically positioned to deliver time critical response and effective patient care. Fire service-based EMS provides this pivotal public safety service while also emphasizing responder safety, competent and compassionate workers, and cost-effective operations.

Stark State College's (SSC's) Emergency Medical Services and Fire Safety Program enroll approximately 300 students each semester across the various course offerings. The department is staffed by a department chair, emergency fire services program coordinator, emergency medical services program coordinator, three full-time emergency medical services faculty members (including the clinical coordinator, who oversees approximately 7,100 separate clinical placements each year at 66 sites) and numerous part-time faculty members and laboratory assistants. With emergency program enrollment anticipated to increase approximately 8.5 percent annually, sufficient space will be needed to support the growth of the program and the expansion of offerings.

To maximize on the opportunity a new Fire Safety Training and Testing Center would bring, the College is working with a consortium of fire safety equipment companies, as well as Marathon Petroleum, to develop a comprehensive center that can be used for general emergency services training, specialized emergency services training relevant to the oil and gas industry and as a test site for fire safety products designed and manufactured in Ohio. This approach expands upon the College's successful public-private partnership model while incorporating new services that would allow the College to support small entrepreneurs involved in fire safety equipment design and development in Ohio.

The objective for developing this broad public-private partnership is to develop a centralized large-scale training and testing facility and to establish programs that allow for current and future growth, activities, enhance efficiency and promote fire safety training and products that respond to fire, safety and emergency service needs. It is the opinion of SSC that this approach will allow the College to share the cost of developing the facility and conducting training and eliminate duplication by creating one facility that can meet many training needs. This approach will also result in a comprehensive fire, emergency and police services training and product testing facility that can be utilized by other entities as needed.

The proposed Fire Safety Training and Testing Center, and the activities of the consortium partners, are relevant to Ohio Third Frontiers scientific fields of interest in Advanced Materials. Specifically, the Center will generate innovative fire safety training modalities and products by creating a collaborative dialogue that allows consortium product manufacturers to test their products in live fire and emergency simulations. Additionally, with the inclusion of Marathon Petroleum as a collaborative partner, the Center will allow product manufacturers within the consortium to open a dialogue with Marathon to develop specialized fire and emergency products that address the needs of the oil and gas industry on Ohio's horizon. Products currently under development by the consortium that will benefit from the Center include composite telescoping mast and light apparatus that can be fitted to emergency vehicles; composite structures that can be set-up and serve as temporary emergency coordination facilities, triage units, etc…; high-temperature safety materials (up to 3000 degree tolerance) for use in electrical arch flaring and high-temperature asbestos removal situations; and pumping apparatus for distribution of foam fire suppression products in small and medium scale fires.

IPP 12-269

Lorain County Community College

December 29, 2011

Ohio Department of Development
Technology and Innovation Division, Attention: IPP 2012
77 South High Street, 25th Floor
Columbus, OH 43215
via email: IPP2012@development.ohio.gov

Re: 2012 IPP LOI

Dear Madam or Sir:

On behalf of Lorain County Community College and our teaming partners, I am delighted to submit this letter of intent to apply for funding through the Ohio Third Frontier Innovation Platform Program RFP. The proposed project, **Integrated Regional Device Manufacturing**, will leverage the resources of the Richard Desich SMART Commercialization Center for Microsystems to commercialize sensor nodes with multiple degrees of freedom that are enabled by advanced semiconductor packaging technologies. Support provided by the Ohio Third Frontier Innovation Platform Program will enable an Ohio-based, cross-functional team to develop these sensor technologies for low-power, wireless network applications. The SMART Center is a unique, industry-focused resource for integrating MEMS, sensors, and microelectronics into new products. With a complete set of tools for microsystem packaging, reliability testing, and inspection, along with process development and design, the SMART Center is a tremendous resource to the microsystems community.

The Lorain County Community College is the lead applicant for this proposal:

Lead Applicant Name:	Lorain County Community College
Lead Applicant Address:	1005 Abbe Road North, Elyria, Ohio 44035
Lead Applicant Phone Number:	440-366-4257
Lead Applicant Contact:	Matthew Apanius, Director The Richard Desich SMART Commercialization Center for Microsystems
Contact's Phone Number:	440-366-4257
Contact's Email Address:	mapanius@lorainccc.edu
Proposed Project Title:	Integrated Regional Device Manufacturing
Estimated Grant Funds to be Requested:	$3 Million
Known Collaborators:	Therm-O-Disc, Inc. 1320 South Main Street Mansfield, Ohio 44907

Lorain County Community College

Thank you for this opportunity. Lorain County Community College has a solid history of partnership and collaboration with regional community, industry, and the commercialization infrastructure of the State of Ohio. I am excited to pursue an expansion of our collaboration through this potentially transformational opportunity for Ohio's economy.

Sincerely,

Matthew Apanius
Director
The Richard Desich SMART Commercialization Center for Microsystems
Lorain County Community College

IPP 12-270

Letter of Intent
Ohio Third Frontier Innovation Platform Program

Lead Applicant

Name

Case Western Reserve University

Address

10900 Euclid Avenue, Cleveland, Ohio 44106

Contact Person

Dr. Frank Ernst
Professor, Department of Materials Science and Engineering

Phone

216.368.0611

E-mail

frank.ernst@cwru.edu

Project Title

Advancing Material Technologies in Ohio through Surface Engineering

Grant Funds

$ 1,200,000 (estimated)

Collaborators

GE Aviation (US), MesoCoat Inc., Rolls Royce Fuel Cell Systems (US) Inc.

Advancing Material Technologies in Ohio through Surface Engineering

As demonstrated in a previous ODoD-funded Wright Project, entitled "Case Center for Surface Engineering," SCSAM (the Swagelok Center for Surface Analysis of Materials) with its large number of synergistic state-of-the-art major instruments for surface analysis of materials at the microscopic level constitutes an important and productive *innovation platform* for Ohio-based industry. SCSAM has an impressive history driving the development of innovative materials that are key for new technologies, new jobs and significant revenue. The **three-year project** we will propose will impact at least three different technologies that critically depend on sophisticated surface engineering of materials.

Bond Coats for Improved Hot Corrosion Resistances on Nickel-Base Superalloys

Nickel-base superalloys have great importance in aerospace engineering for jet engine components, owing to their superior strength at high temperatures. One pressing current concern is high-temperature corrosion - the oxidation of such structural components at temperatures between 650 and 900°C in sulfur-containing environments (so-called type-I and type-II "hot corrosion"). To extend engine life, alloy bond coats need to be deposited on critical engine components to improve hot-corrosion resistance. The **Aviation Division of GE (General Electric)** views the engineering of better bond coats as key to their continued success as a major supplier of jet engines. In this project we will be using advanced TEM (transmission electron microscopy) techniques to study different novel bond coats formulated, fabricated, and tested by GE.

Improved Low Friction Non-Toxic High Toughness Coatings

MesoCoat and CWRU will collaborate on accelerating the pace of materials improvements in MesoCoat's line of PComP coatings. In the non-aerospace arena, these are intended to replace chrome coatings for hydraulic cylinders, boilers and petrochemical applications. The aerospace arena requires coatings that are cost effective, easily machinable, and have high toughness and low density. High-wear applications, in particular, require coatings with 3-5 times the toughness of current WC/Co coatings. In all these developments, SCSAM's state-of-the-art surface characterization tools will play a central role in advancing commercialization of new coating systems.

Solid-Oxide Fuel Cells

SOFCs (solid-oxide fuel cells) are devices that convert the chemical energy of fuel directly into electricity and are a prime component of the emerging sustainable energy technologies in the US. However, before such devices can become available for broad-based usage, a variety of materials-related problems need to be solved. All of these require sophisticated methods for observing the structure and chemical composition of fuel-cell components before and after service at very high spatial resolution and with state-of-the-art analytical sensitivity. One of the major "players" in SOFCs, **Rolls Royce Fuel Cell Systems (RRFCS)** intends to continue their very successful collaboration with CWRU on microcharacterization of critical thin film SOFC components using the sophisticated, state-of-the-art instruments of SCSAM and the corresponding expertise of CWRU faculty. With this collaboration, we are certain to make a major contribution to the imminent commercialization of RRFCS' base power modules.

IPP 12-271

2012 IPP LOI (Letters of Intent)

Project Title: Hybrid Electric Propulsion and Power Management/Control System for Aircraft

Lead Applicant: Wright State University
3640 Col Glenn Highway, Dayton, Ohio 45435
937-775-5086; 937-775-5082 (Fax)

Contact Person: Prof. Junghsen Lieh, junghsen.lieh@wright.edu

Estimated State Funds: $1,200,000

Collaborators: Spectral Energies LLC
5100 Springfield St, Suite 301
Dayton, OH 45431
937-266-9570

Zybron Optical Electronics
3915 Germany Lane
Dayton, OH 45431
937-427-2892, 937-427-3252(Fax)

Scientific/Technical Areas: Aeropropulsion, Power Management, Energy Storage, Solar Cells

Summary of the Proposed Project

Due to high fuel consumption and pollutions, a hybrid electric propulsion and power management/control system is considered as one of the best solutions. Placing a high efficiency motor (such as sensorless BLDC motor), solar panels and high capacity batteries (such as lithium based) in parallel with an internal combustion (IC) engine, the hybrid system can achieve better fuel consumption for a longer flight and can also reduce heat, smoke and noise signatures. This improves the performance of aircraft and provides safety for soldiers and pilots. Hybrid electric technology has been successfully implemented in automobiles. Unmanned aerial vehicles (UAVs) and private airplanes could benefit from the same technology. For military application, the sensors and equipment that are attached to UAVs enable troops to see who or what is waiting over the next hill and make the vehicle less detectable. For commercial airplane application (especially for private planes), electric propulsion can be used as the backup power for emergency landing in case of engine failure. For environmental monitoring application, a hybrid electric system can help detect hazardous conditions and offer rescue assistance.

There are a number of basic hybrid electric propulsion configurations: series, parallel, mixed configurations, etc. Based on these configurations, two (2) prototypes were developed by the author. These prototypes not only increase the energy efficiency and reduce pollutants but also have the ability to offer individual (engine or motor) and mixed drive options for the need of different missions. The hybrid electric control and power management system (including hardware and software) to be developed will be used to optimize the energy efficiency during flight through regenerative electric charging cycle. The research team will commercialize the inventions, new technologies and products that are resulted from the project.

IPP 12-272

Letter of Intent

Lead Applicant: The University of Akron

Address: The University of Akron, 302 Buchtel Common, Akron, OH 44325-2102

Phone Number: 330-972-6459 (Office of Research Services and Sponsored Programs, Emily Njus)

Contact Person: M.D. Soucek (330-972-2583) (msoucek@uakron.edu)

Proposed Project Title: Development and Commercialization of Green Coatings

Estimated State Funds to be Requested: $3,000,000

Collaborators: DOD, UARF

Project Summary

Technical Project Summary

There are two driving forces in the coating industry, one is the replacement of petrochemical based polymers with biobased polymers, and a second is the replacement of petrochemical based organic solvents with biobased reactive diluents. Environmental regulations dictate low emissions of volatile organic solvents (VOCs) from coatings into the environment both in the United States and in the European Union. There are three pathways to address environmental regulation: 1) convert to from Soventborne to Waterborne (water-reducible or latex), 2) Covert from Solventborne to Powder, and 3) use reactive diluents instead of solvents. These three pathway all can use biobased polymers and oligomers to form a new which form a new technology platform for the coatings industry. Biobased reactive diluents replace organic solvents which pollute the environment with biobased molecules that reduce viscosity, and participate in the film forming mechanism. Reactive diluents can be used in either solventborne or waterborne systems. For solventborne systems, the development of reactive diluents is crucial, since water does not interact well with many substrates including wood, paper, metal, and plastics. For waterborne coating systems, it will replace coalescing solvent which can be VOCs, diminish performance, or present other health hazards. A new class of biomass derived reactive diluents developed at the UA will be used to formulate ultralow VOC wood coatings. In addition, the reactive diluents will be used for formulating alkyd primers and sealers for plasterboard, as well as other substrates. The reactive diluents will also be used in spray can applications for paint. Lastly, the reactive the diluents will be formulated into waterborne coatings as replacement of coalescing solvents.

Supply Chain for Technology and Economic Impact

The University of Akron is ideally situated geographically to support the coatings industry ($8 billion, US). Within 100 miles are Sherwin-Williams (corporate, waterborne, and industrial coatings facilities), PPG, (Automotive, Powder, and corporate R & D), RPM (corporate, and roof coatings), Akzo-Nobel (largest coatings company world-wide, North American Research Center), and at least 25 smaller coatings companies and suppliers. The University does an excellent job with respect to creating new technology, and can scale-up to 50 L quite well, but there is a problem with regard to moving the technology to the next step. There is a need for a factory level scale to both lure companies to Ohio and push technologies coming out of the Universities to commercialization. The concept is to have a time share factory where a tenant would be able to share the expense of equipment and facilities with other tenants. This is a similar concept as an incubator with the addition of the final step required to be successful, that is the making and selling product. The shared factory would be fully permitted, and ready to for companies to start producing with control of their intellectual property, shortening lag to production and the generation of capital. As the demand of the products increased, the tenant would be transitioned into their own factory space assisted by DCGC team. Ideally, the factory space would be located in the same locale in an industrial park.

IPP 12-273

CASE WESTERN RESERVE UNIVERSITY
CASE SCHOOL OF ENGINEERING

Department of Macromolecular Science and Engineering
Kent Hale Smith Building

10900 Euclid Avenue
Cleveland, Ohio 44106-7202

Visitors and Deliveries
2100 Adelbert Road

Phone 216.368.4172
Fax 216.368.4202
E-mail polymer@case.edu

www.case.edu

December 29, 2011

To: IPP2012 - Ohio Department of Development

Re: IPP2012 Letter of Intent

Lead Applicant: Case Western Reserve University, Cleveland, Ohio

Lead Contact: Prof. Gary Wnek, Department of Macromolecular Science and Engineering; gew5@case.edu; 216-368-3116

Proposed Project Title: Products to Promote Healing of Recalcitrant Wounds

Technology Subject Matter Area: Medical Technology (regenerative medicine); secondary subject area: Advanced materials (polymers)

Estimated State Funds Requested: $1,300,000

Collaborators: Profs. Eben Alsberg and Thomas Steinemann, CWRU; Laurence Berlowitz, President and CEO of Anexis LLC (new company focusing on materials for regenerative medicine to be launched in Ohio); Nanofiber Solutions; another Ohio company (TBN)

Summary of Proposed Project

Tissue repair and regeneration requires three key components: (1) scaffold or matrix, (2) cell communicators and stimulators, and (3) cells. Regarding (1), we have access to an exceedingly broad and versatile scaffold materials platform that can be tuned to address multiple needs for a scaffold, including a mechanical support for cells, porosity to encourage cell proliferation along with vascularization and/or innervation as desired, the ability to attract cells and stimulate differentiation, and the ability to incorporate and release therapeutic molecules. Advanced materials development at Case Western Reserve University, specifically dealing with polymeric scaffold design and fabrication, is the basis of this platform. In addition, we have access to proprietary data on novel cell communicators and stimulators (2) that, when coupled with our scaffold materials, represent novel compositions of matter with broad applications in regenerative medicine. We believe that cells (3) are best recruited from the body's own supply and transformed into specific cell types as needed, mitigating potential problems with incompatibility and other complications. In our opinion, this combination of materials, cells and cell communicators/stimulators represents an exciting new paradigm for tissue repair and regeneration, and is within reach with judicious identification and selection of cell communicators/stimulators. Ideally, such molecules should be efficacious in extremely small quantities, be stable under without undue need for environmental control during storage, and be easily incorporated into scaffold materials via direct solubilization or covalent attachment. Significantly, the proper molecule(s) will obviate the need to pre-incorporate cells such as dermal fibroblasts into the scaffold materials prior to use, which will significantly reduce the costs of product fabrication and storage as well as patient treatment. Our approach contrasts with other technologies employing wound-healing scaffolds containing live allogeneic cells that require long fabrication times and which have never been shown to properly regenerate multi-layered epithelium. We believe that the benefits of our overall approach are clear.

A new company, Anexis LLC, is being formed to catalyze rapid deployment and significantly leverage Ohio DoD investment. Initial attention, based on market opportunity assessment, will be given to ocular repair (cornea and retina) and neurodegenerative diseases such as multiple sclerosis. Strong collaborations with medical personnel are in place that will accelerate commercialization of our novel materials platforms. Also, discussions are underway with companies in Ohio and elsewhere regarding commercial partnerships in specific areas of focus.

Wnek - CWRU

IPP 12-274

THE OHIO STATE UNIVERSITY

College of Engineering

142 Hitchcock Hall
2070 Neil Avenue
Columbus, OH 43210-1063

December 29, 2011

Dear Ohio Third Frontier Program,

We are writing to inform you of our intent to submit a proposal to the 2012 Innovation Platform Program.

Title: NextGen Systems for Improved Competitiveness in General and Business Aviation
Lead applicant: The Ohio State University
Contact Person:

Professor Seth B. Young
Director, Center for Aviation Studies
The Ohio State University
1971 Neil Avenue, Suite 508D
Columbus, OH 43210
tel. 614-292-4556
e-mail: young.1460@osu.edu

Known Collaborators: NetJets
Estimated State Funds Requested: $2,200,000
Technology Subject Matter: Sensing and Automation Technologies

Project Summary:

NextGen, the Next Generation Air Transportation System, offers the promise of a new universe of flight efficiency resulting in: reduced delays and carbon emissions; smoother in-flight and on-ground operations; lower vulnerability to the challenges of airport congestion, weather or human error in air traffic control. Properly and widely implemented, NextGen could remake civil aviation and save billions of dollars.

Work being performed at the FAA NextGen testbed center in Florida simulates the implementation of digital communication technologies that would improve the safety and efficiency of air traffic management. In addition, NextGen ADB-S technology enables a much broader array of route selections, substantially increasing capacity in busy air corridors and improving robustness of traffic management in, e.g. inclement weather conditions. What has yet to be performed, at least within the general aviation environment (including business aviation), is the actual integration of such technologies on actual airport surfaces.

We propose to accelerate commercial viability of these technologies by testing and refining on the airfield, integrating with actual general aviation and business aviation aircraft, as well as local air traffic control towers and regional tracons within class E, D, and C airspace. The field location for this research would be The Ohio State University Airport.

Sincerely,

Randolph L. Moses
Associate Dean for Research

IPP 12-275

Letter of Intent

Lead Applicant: The University of Akron

Address: The University of Akron, 302 Buchtel Common, Akron, OH 44325-2102

Phone Number: 330-972-6764 (Office of Research Services and Sponsored Programs)

Contact Person: C. Monty (chelseamonty@uakron.edu); 330-972-7255

Proposed Project Title: **Sensor Development for Water Management and Engineering**

Estimated State Funds to be Requested: $3,000,000

Collaborators: Parker-Hannifin Corporation, Cleveland, OH
Applied Vision Corporation, Akron, OH

Project Summary

Considering water and wastewater services, as well as equipment, chemicals, and consulting services, the U.S. water industry exceeds $120 billion in annual revenues (U.S. Census Bureau, 2009). Water utilities account for approximately $40 billion and the wastewater utilities account for approximately $40 billlion, with the remainder being equipment, chemicals, and consulting services. In a recent state of the industry survey (AWWA, 2011), water treatment plants identified regulatory requirements and monitoring as important issues. It is clear that approaches including technology are needed for municipalities to properly manage their drinking water supplies as well as have the capacity to engineer their water and wastewater treatment processes. *Another important water issue facing Ohio specifically is the management of produced water created by the hydraulic fracturing process for natural gas development. As much as 2-3 million gallons of water can be produced from a single well. There are additional concerns associated with contaminated groundwater and monitoring water quality.* The University of Akron, in conjunction with local partners (Parker-Hannifin Corporation and Applied Vision Corporation) is well-positioned to serve this market. This proposal represents a collaborative effort to develop sensors and software for cost-effective water management and engineering.

The University of Akron (UA) has a database (with varying sampling history) of fluorescence data-excitation-emission matrices (EEM) scans from five water treatment plants in Ohio. We believe this database to be one of the most comprehensive fluorescence data set from water plants in the United States. The objective of the sampling effort has been to capture the seasonal variation of source waters, as well as the ability of the plant to reduce specific components of the organic matter from the water during coagulation. Additional analysis has been provided using a simple, easy-to-use water analyzer manufactured by Parker Hannifin (Cleveland, Ohio). Applied Vision Corporation (Akron, Ohio), an international market leader in machine vision inspection technology, will assist with software development. The sensors developed in this work will be used as an add-on analysis to the Parker Hannifin water analyzer and will also be developed into a separate, stand-alone sensor device.

Despite the best efforts of water monitoring using current technology, the level of toxic water contaminants delivered to the end-user will vary based on a variety of factors such as the type of piping system, type of disinfectant, and distance (time since disinfection) from the water purification plant. Although the 2010 sample average in the City of Akron was below the maximum contaminant level (MCL) of 80 µg/L, there were sampling sites in the distribution network that exceeded the MCL by over ten percent. UA has developed the technology to monitor THMs and other toxic organic compounds in real-time. These sensors use both colorimetric and electrochemical detection methods in order to provide both a qualitative and quantitative analysis of the contaminated drinking water. Using these simple detection methods allows for a more affordable option for monitoring water quality within the distribution system as well as directly in the homes of individual consumers.

The objective of this proposal is to develop sensors for monitoring toxic organic compounds (disinfection by-products, water contaminants) in a variety of water sources. Sensor development at UA will initially be directed to the detection of THMs in the drinking water distribution system and water treatment plants and will then be extended to the detection of other organic water contaminants in order to create a sensor array. The sensor array created in this work will provide both qualitative and quantitative analysis about the types of contaminants present as well as the toxicity of a water sample. UA will work with Parker Hannifin to integrate this array into their current water analyzer and will also collaborate on the development of a stand-alone sensor array unit. Applied Vision will assist in the development of the necessary pattern recognition software to evaluate sensor array response. This response will then be used by water treatment plants, natural gas development companies, or drinking water consumers to allow them to effectively manage their water supply.

IPP 12-276

Letter of Intent (LOI) for Submission of a Full Proposal to the Ohio Third Frontier Innovation Platform Program

Lead Applicant

Name: **The University of Toledo**
Address: **2801 West Bancroft Street, Toledo OH 43606**
Contact: **Michael J. Heben, Ph.D.**
Phone / E-mail: **(419) 530-3870 / michael.heben@utoledo.edu**

Known collaborators at time of this Letter of Intent, December 28, 2011:

Ferro Corporation, Mayfield Heights OH
Isofoton North America, Napoleon OH
Solar Spectrum, LLC, Toledo OH
The University of Toledo, Toledo OH
Willard and Kelsey Solar Group, Perrysburg OH

Proposed Project Title:
Innovation Platform for Solar Photovoltaics

Estimated dollars requested from OTF: **$3,000,000.^{00}**

Description of the Proposed Effort:

Northwest Ohio and The University of Toledo (UT) have spent twenty-five years building a cluster in Solar Photovoltaics by leveraging the more than century-old glass industry in the region. Through OTF, federal, private, and institutional investments, UT has developed technology capabilities and strengths, talent, equipment, and facilities that are able to serve as a vehicle for significant, industry-defined and directed development and commercialization opportunities for new products and innovations. Further resources that will support this mission include engaged industry partners, a history of research commercialization and innovation, and a national track record for excellence in creating and handling intellectual property.

The effort proposed here will link the development and innovation capabilities of our resources and capacities to several specific late stage development and innovation needs of our corporate partners. This effort will lead to job creation and business opportunities within Ohio through development and commercialization of new technologies, and innovations and products that will have beneficial long-term economic impacts for Ohio.

IPP 12-277

THE OHIO STATE UNIVERSITY

Nanotech West Laboratory

100 Science Village
1381 Kinnear Road
Columbus, OH 43212

Phone (614) 688-3055
Fax (614) 688-3379

29 December 2011

Ohio Department of Development
77 S. High Street
Columbus OH 43216

Ladies and Gentlemen:

Let this serve as a Letter of Intent for a possible submission of a proposal titled "Ultra-Large Format Small-Pitch Infrared Sensors", to your Innovation Platform Program, with myself as Principal Investigator. My contact information is listed in the letterhead above and my email address below. Our known collaborators at this time are L-3 Communications (Mason OH) and Lake Shore Cryotronics (Westerville OH), and at this time we plan to submit a $3M proposal for 3 years.

This proposed program will develop semiconductor process technology for small-pitch pixel (less than 10x10 microns) infrared (IR) focal plane arrays based on compound semiconductor technology. Specific problems to be solved include dark current leakage due to sidewall etch and passivation steps, ohmic contact specific resistance issues, materials and process uniformity issues, and inline electrical probing problems. The goal of the project will be to bring high-density IR focal plane arrays to the commercial and military markets as well as new cryogenically-cooled electrical probe stations.

The Innovation Platform that will serve this proposed program is the Ohio State Nanotech West Lab, a proven user facility that currently serves over 250 users including, on average, approximately 32 Ohio small- and medium-sized companies per year as well as approximately 70 Ohio State research programs. As you well know, in the past years Nanotech West has received significant capital investments from the Ohio Wright Center for Photovoltaics Innovation and Commercialization (PVIC) as well as from the Ohio Wright Center for Multifunctional Polymer Nanomaterials and Devices (CMPND). These capabilities will be used heavily for this proposed program.

If you have any questions do not hesitate to contact me at the phone or email address below.

Sincerely,

Robert J. Davis, Ph.D.
Director, OSU Nanotech West Laboratory
Co-Director, Ohio Wright Center for Photovoltaics Innovation and Commercialization (PVIC)
Associate Director, Ohio State Institute for Materials Research
614.292.7309 / davis.2316@osu.edu

IPP 12-278

THE OHIO STATE UNIVERSITY

Nanotech West Laboratory

100 Science Village
1381 Kinnear Road
Columbus, OH 43212

Phone (614) 688-3055
Fax (614) 688-3379

29 December 2011

Ohio Department of Development
77 S. High Street
Columbus OH 43216

Ladies and Gentlemen:

Let this serve as a Letter of Intent for a possible submission of a proposal titled "High Operating Temperature Short Wave Infrared Detectors", to your Innovation Platform Program, with myself as Principal Investigator. My contact information is listed in the letterhead above and my email address below. Our known collaborators at this time are L-3 Communications (Mason OH) and Lake Shore Cryotronics (Westerville OH), and at this time we plan to submit a $3M proposal for 3 years.

This proposed program will develop semiconductor process technology for 2.5 micron wavelength infrared (IR) and possibly dual-wavelength photodetectors based on compound semiconductor technology. The goal of the project will be to bring new high-density IR focal plane arrays to the commercial and military market as well as new electrical probe stations suited for inline process monitoring, among others.

The Innovation Platform that will serve this proposed program is the Ohio State Nanotech West Lab, a proven user facility that currently serves over 250 users including, on average, approximately 32 Ohio small- and medium-sized companies per year as well as approximately 70 Ohio State research programs. As you well know, in the past years Nanotech West has received significant capital investments from the Ohio Wright Center for Photovoltaics Innovation and Commercialization (PVIC) as well as from the Ohio Wright Center for Multifunctional Polymer Nanomaterials and Devices (CMPND). These capabilities will be used heavily for this proposed program.

If you have any questions do not hesitate to contact me at the phone or email address below.

Sincerely,

Robert J. Davis, Ph.D.
Director, OSU Nanotech West Laboratory
Co-Director, Ohio Wright Center for Photovoltaics Innovation and Commercialization (PVIC)
Associate Director, Ohio State Institute for Materials Research
614.292.7309 / davis.2316@osu.edu

IPP 12-279

CASE WESTERN RESERVE UNIVERSITY EST. 1826

James D. McGuffin-Cawley
Arthur S. Holden Professor of Engineering & Chair
Department of Materials Science and Engineering
Case School of Engineering White Building, Room 312
10900 Euclid Avenue
Cleveland, Ohio 44106-7204
Phone 216.368.4230
E-mail emse-info@case.edu
http://dmseg5.case.edu/

December 29, 2011
Dear Ohio Department of Development,

Please accept this Letter of Intent (LOI) from Case Western Reserve University (CWRU) for participation in the Third Frontier Innovation Platform Program.

Lead Applicant's Name:	Case Western Reserve University (CWRU)
Address:	Department of Materials Sci. & Engr. 10900 Euclid Avenue 312 White Building Cleveland, Ohio 44106
Telephone:	(216) 368-6482
Contact Person:	James McGuffin-Cawley
Contact Email:	cawley@case.edu

Proposed Project Title: Device Engineering and Alloy Development of Compact, High-Authority, Solid-State Actuators

Estimated Grant Funds to be Requested: $3 Million

Known Collaborators: Manufacturing Advocacy and Growth Network (MAGNET), 1768 E. 25th St., Cleveland, OH 44114; NASA Glenn Research Center 21000 Brookpark Road Cleveland, OH 44135

Project Summary

Motion control is a key aspect of design and operation of engineered devices. Often this is accomplished through gearing, hydraulics, and/or pneumatics. However, there is critical subfield that benefits from the performance of solid-state devices exploiting fundamental properties of (both metallic and nonmetallic) materials with particular internal crystal structures. These include shape memory alloys and piezoelectric ceramics.

Some of the advantages of solid state are:

- Compactness: this reduces the mass and volume reducing inertial forces in moving systems, lowering energy penalties in aviation applications, and permitting spatially constrained use in biomedical, and other, applications;
- Broad Service Temperature: notably high temperature applications or inaccessible applications where lubrication is difficult or not possible (due to evaporation or charring, etc.), but also low temperatures (where increases in viscosity become large and difficult to control);

- Reliability: the absence of sliding surfaces greatly improves reliability, which is a key issue for implantable medical devices as well as remotely deployed system (e.g., at the top of towers or underwater);
- Both Passive and Active Control Possible: when the material is appropriately engineered the system can be designed to respond to changes in ambient conditions without the need for integrated sensors and control electronics.

Ohio is home to leading industries and institutions that process both shape memory alloys and piezoelectric ceramics. In addition, notably Northeast Ohio, has a range of industries, large and small, devoted to industrial automation and control technology.

Solid state actuation is important in biomedical, aerospace, automotive, and joining technologies. Successful application in these areas requires closely controlled materials processing on several length scales. These include: the formulation of particular compositions of alloys and ceramics (both average composition and uniformity of composition); metastable phase production through heat treatment and deformation processing; control of microstructural defects, e.g., inclusions; and surface engineering.

We propose to use the CWRU facilities associated with the Nitinol Commercialization Accelerator (a 2009 3rd Frontier Wright Project), laboratories on site at NASA Glenn, and characterization tools within the CWRU Swagelok Center for the Surface Analysis of Materials in close partnership with an array of Ohio companies to accomplish three types of projects:

- Device Design using Existing Materials: to permit existing materials to be incorporated in new or improved designs of new-term commercial products;
- Improved Processing for Defect Removal/Reduction: to allow increased reliability of materials, and consequently actuation devices, to yield a competitive advantage;
- Alloy Development and Design Incorporating Integrated Computational Methods: to reduce the time to develop and deploy new alloys tailored for particular properties under particular service conditions (given Ohio's leading role as a primary materials producer, alloys and ceramics are an important product in and of themselves).

Sincerely yours,

James D. McGuffin-Cawley

IPP 12-280

December 29, 2011

Innovation Platform Program
Ohio Third Frontier

Dear Committee,

This letter indicates our intention to submit a proposal entitled "Development and Commercialization of Combined Metabonomics and Positronium Based Detection and Monitoring of Childhood and Adult Diseases" to the Ohio Third Frontier Innovation Platform Program.

The lead institution will be Miami University, building on their existing Innovation Platform defined by their Center of Excellence in Biomedicine in Structural Biology and Metabonomics. The two for-profit companies include Positronium Research, Inc LLC and Bruker Biospin, Inc.

The Principal Investigator, Professor Kennedy, has a long record of development and application of nuclear magnetic resonance (NMR) spectroscopy and liquid chromatography mass spectrometry methods to detection, monitoring, and discovery of etiology human disease pathology, and has substantial current National Institutes of Health support for development and application of these technologies to human diseases.

Our first for-profit company is the Bruker Biospin company, which is based in Germany and the Unites States, and which is a leader in development of NMR instrumentation and application of NMR spectroscopy based metabonomics research. Dr. Kennedy has a long-standing collaboration with the Bruker company, which enables a premier platform for innovation of this technology for commercialization. Our technical collaborators at Bruker Inc. include Werner Maas, Manfred Spraul, and Kim Colson.

Our second for-profit company is Positronics Research Inc, which is currently based in Scottsdale, Arizona. Our collaborator at Positronics Research is Gerald Smith, a 1957 Physics graduate of Miami University and a PhD in Physics from Yale in 1961, who went on to a laudable career culminating in his service as the Chair of the Physics Department at Penn State beginning in 1983. Dr. Smith established and is the President of Positronics Research, building on a patented technology that uses detection of long-lived positronium atoms for sensitive and specific detection of gases in complex mixtures. This patented technology is ideal for detection of gases indicative of pathologies in exhaled breath of patients with a variety of diseases. Dr. Smith is willing to relocate or reincorporate Positronics Research in the State of Ohio in support of this Innovative Platform Technology project. Dr. Smith is confident that his patented instrument can be used at the bedside in a hospital setting for real-time diagnosis and monitoring of disease states. Manufacturing is anticipated to produce a product that can be sold in the range of

$50,000-$100,000 per unit. If the instrument becomes widely used, one can imagine significant job creation in the State of Ohio to produces these new medical instruments.

Development and application of these technologies requires access to substantial clinical population studies. Dr. Kennedy has more than a dozen current collaborations with medical doctors at the Cincinnati Children's Hospital Medical Center and doctors and surgeons at the University of Cincinnati Medical Center, and the potential application of the combination of metabonomics and postronium based detection, monitoring, and diagnosis of diseases can be fruitfully developed in the context of this large number of existing collaborations.

Our proposal specifically responds to the "Medical Technology related to Imaging, Surgical Instruments/Equipment, Implant Devices, and Regenerative Medicine" focus area outlined in the RFP. Specifically, we propose to develop and commercialize innovative medical technologies related to novel medical instrumentation and innovative applications of these novel technologies. The collaboration with Positronics Research is expected to create a new business in the first year producing innovative medical instrumentation. The combination of technology development of the Center of Excellence in Biomedicine at Miami University, the Bruker Biospin company, and Positronics Research, in collaboration with physicians at the Cincinnati Children's Hospital Medical Center and the University of Cincinnati Medical Center is expected to result in creation of a CLIA based for-profit new business in the State of Ohio to conduct Esoteric Tests that require the combination of NMR and positronium based metabolite and gas detection that will be used for disease detections.

In closing, we look forward to the opportunity to submit a full proposal entitled "Development and Commercialization of Combined Metabonomics and Positronium Based Detection and Monitoring of Childhood and Adult Diseases" to the Ohio Third Frontier Innovation Platform Program.

Please do not hesitate to contact me if any further information is required regarding our letter of intention.

Sincerely,

Michael A. Kennedy, PhD

Eminent Scholar and Professor
Department of Chemistry and Biochemistry
Miami University
160 Hughes Hall, Room 106
701 East High Street
Oxford, OH 45056

513-529-8267 (office)
513-529-5715 (fax)
michael.kennedy@muohio.edu

OTF IPP: Letter of Intent

O-WISTEC: Ohio WIde Bandgap Semiconductor TEchnology Center

Solicitation	**Ohio Third Frontier Innovation Platform Program**
Title	**O-WISTEC: Ohio Wide Bandgap Semiconductor Technology Center**
Budget	**$3 Million**
Lead Applicant/ Contact person	**Prof. Siddharth Rajan**
Affiliation	Electrical and Computer Engineering The Ohio State University
Address	2015 Neil Avenue 205 Dreese Laboratory Columbus OH 43215 Tel: 614-247-7922 Fax: 614-292-7596 E-mail: rajan@ece.osu.edu
Collaborators	**1. Momentive Performance Materials, Strongsville OH** **2. Air Force Research Laboratory (AFRL/RYDD), Dayton OH** **3. Traycer Systems, Columbus OH**
Co-applicants	**Profs. Steven A. Ringel, Wu Lu, Jin Wang**

Technical Summary

Key technical field: Aeropropulsion and Power Management, Sensing and Automation Technologies

The objective of this **Innovation Platform Program** proposal is to create an **Ohio Wide Bandgap Semiconductor Technology Center** that will target commercialization of Gallium Nitride semiconductor technology for a range of applications, including energy-efficient solid-state lighting, power electronics, and high-frequency communications and sensing. The outcome of this program will move the State of Ohio a leading competitor for this worldwide fast-growing market. The project will aim for the following outcomes:

1. Upgrade existing university infrastructure to enable prototyping and evaluation of state-of-art Gallium Nitride devices,

2. Demonstrate bulk GaN substrates and devices for applications in high-efficiency high-power electronics (Momentive, OSU, AFRL) and solid-state lighting applications (OSU, Momentive) leading to commercialization of Momentive substrates, and

3. Develop and commercialize semiconductor device technology for high-frequency applications (OSU, AFRL, Traycer).

One of the main challenges in Gallium Nitride technology has been the absence of large area, high-quality substrates. Technology for applications such as solid state (LED) lighting, power electronics, and high frequency electronics is currently based on *lower-quality* semiconductor layers grown on alternate substrates such as Silicon Carbide and Sapphire.

The three main steps for semiconductor devices are crystal growth, device synthesis, and device evaluation. Under this project, **Momentive Performance Materials** will develop crystal growth of high-quality *native* Gallium Nitride substrates. These will be provided to **Ohio State University** and **Air Force Research Laboratory,** who will synthesize and evaluate semiconductor devices on the substrates, enabling Momentive to **commercialize the substrates**. **Traycer Systems** will work to **commercialize Gallium Nitride devices** for high-frequency applications.

Momentive Performance Materials will carry out commercial production of their bulk substrates in Strongsville OH. These substrates will feed a growing worldwide market for GaN semiconductor devices. Traycer Diagnostic Systems will commercialize GaN devices for high-frequency applications such as sensing, communication, and imaging.

IPP 12-282

THE OHIO STATE UNIVERSITY
OARDC

Ohio BioProducts Innovation Center

152 Howlett Hall
2001 Fyffe Ct.
Columbus OH 43210-1066
Phone 614-292-2922
FAX 614-247-4739

Memorandum

DATE: 29 January 2011

FROM: Dennis Hall, Assistant Director OBIC

RE: Letter of Intent for Innovation Platform Program

The Ohio BioProducts Innovation Center intends to submit an Innovation Platform Program proposal. Please see the information below regarding the Letter of Intent required for submission:

Title:	Center for Excellence in Biobased Composite Products
Lead Applicationt:	Ohio BioProducts Innovation Center
Contact:	Dennis Hall, Assistant Director
Address:	152 Howlett Hall 2001 Fyffe Court Columbus, OH 43210-1066
Phone:	292-4188
Email:	hall.16@osu.edu
Requested Funds:	$3,000,000.00
Collaborators:	OBIC Alliance Company Members and Research Institutions

Attached, please find a summary of the proposed project.

Project Summary

This Innovation Platform Program proposal will leverage existing capabilities to create a Center of Excellence in Biobased Composite Products (BCP). By combining proven technologies that provide price and performance benefits, a strong industrial network of collaborators and excellent demand from markets such as light-weighting of vehicles in the transportation sector, LEED Certified/ Green Buildings and State and Federal Bio-preferred Procurement, Ohio has an opportunity to catalyze job and economic growth. The BCP program will link Ohio assets in advanced natural fiber technologies, novel elastomeric compounds, and application development expertise.

IPP 12-283

Renovo neural

Dec 29, 2011

FY2012 Ohio Third Frontier Innovation Platform Program (OTFIPP)
Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th floor
Columbus, OH 43215

Sub: Letter of intent by Renovo Neural, Inc. to submit a proposal for FY2012 OTFIPP

Lead Applicant:	Renovo Neural, Inc. 10000 Cedar Avenue 3rd Floor Cleveland, OH 44106 Phone: 216-445-4252 Fax: 216-445-2981
Lead Applicant Contact:	Satish Medicetty President smedicetty@renovoneural.com
Project Title:	Development of novel therapeutics for Multiple Sclerosis
Funds Requested:	2,500,000
Known collaborators:	Cleveland Clinic Case Western Reserve University
Project Summary:	See page 2

Sincerely,

Satish Medicetty, DVM, PhD, MBA
President
Renovo Neural, Inc.

Project Summary:

Renovo Neural Inc. (RNI) is developing compounds that can promote remyelination and restore neural function in multiple sclerosis (MS) patients. MS is the leading cause of non-traumatic neurological disability in young adults and affects over 400,000 individuals in the United States and over 2.5 million individuals throughout the world. MS is a chronic inflammatory disease of the CNS in which the myelin sheaths wrapped around the axons are damaged leading to demyelination and other neurological symptoms. The damage to the myelin sheaths compromises the ability of nerve cells to conduct electrical impulses through their axons and thereby affecting the communication between the cells. Although the exact cause of MS is not known, the onset is characterized by infiltration of immune cells and the destruction of oligodendrocytes and myelin leading to loss of neural function. The currently marketed anti-inflammatory drugs developed to combat MS are able to delay the disease progression but cannot correct the neural damage. RNI aims to use small molecules to therapeutically stimulate endogenous oligodendrocyte progenitor cell (OPC) differentiation into mature oligodendrocytes that will enhance remyelination (regeneration of myelin) to restore neural function.

RNI was established by Third Frontier funds to develop and commercialize preclinical assays to test drugs for MS. Currently, RNI has commercialized two assays: (a) In vitro high content and high throughput cell-based screening to identify and evaluate novel MS drugs and (b) In vivo efficacy test in a mouse model of demyelination (a characteristic feature of MS). These assays represent significant technological advances that can lead to the identification and evaluation of small molecules that can promote remyelination. RNI has been successful in creating jobs (currently 10 employees) and revenue by offering its services (assays) to pharmaceutical companies that are developing MS drugs.

Previously, a compound library of 14,000 compounds was screened (at Cleveland Clinic) for OPC differentiation into oligodendrocytes and several hits were identified. RNI has exclusive rights to compounds and methods promoting remyelination covered by a patent application from Cleveland Clinic. RNI currently has a lead compound and its derivatives and analogs showing promising data in the OPC differentiation assay. This grant will provide the assets and funding for lead optimization and preclinical testing of the lead compound. Through collaborations with researchers at the Cleveland Clinic, Case Western Reserve University, and other Ohio Institutions, we will develop the lead compound as a novel therapeutic to promote remyelination in MS.

IPP 12-284

CASE WESTERN RESERVE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES

Michael A. Martens
Associate Professor
Department of Physics
Rockefeller Building
Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-7079
Michael.Martens@case.edu
216-368-4123

29 December, 2011

To the directors of the Ohio Third Frontier Innovation Platform Program,

I am happy to submit this letter of intent to apply for the abovementioned Program in the technology area: "Medical Technology related to imaging, surgical instruments/equipment, implant devices, and regenerative medicine."

The Lead Applicant Data for this letter of intent are:

1) Name, Address, Phone Number

Medical Imaging Physics
Physics Department
109 Rockefeller Bldg.
Case Western Reserve University
10900 Euclid Ave.
Cleveland, OH 44106-7079
216 368 4123

2) Contact Person, Email Address

Michael A. Martens, Ph.D.
michael.martens@case.edu

3) Proposed Project Title:
Ohio Platform for Tomorrow's Industrial Medical Imaging Systems and Equipment – ("OPTIMISE")

4) Estimated Proposed Request for State Funds: $1.5M - $3M
It is likely that our (large) number of industrial collaborators (see below) will respond quite positively to OPTIMISE with commitment letters that will provide cost-share for the upper-end of the estimated request ($3M).

5) Proposed Tentative Ohio Industrial Collaborators in alphabetical order include: AllTech Medical Systems America (Solon OH), GE HealthCare (Aurora OH), Hyper Tech Research (Columbus OH), Philips Medical Systems (Highland Heights OH), Quality Electrodynamics (Mayfield Village OH), Toshiba Medical Research Institute USA (Mayfield Village OH), and ViewRay Inc. (Oakwood Village OH).

6) Summary of Proposed Project:

The OTF Innovation Platform OPTIMISE resides in the area of **Medical Technology related to imaging and with connections to surgical instruments/equipment, implant devices, and regenerative medicine**. OPTIMISE is proposed by the Medical Imaging Physics (MIP) group in the Physics Department of CWRU. MIP has a 30-year history of success in developing exceptional research strength and an established Innovation Platform in the design, optimization, and prototyping of imaging hardware for Ohio's medical imaging industry sector. The extant MIP Platform has unique hardware modeling capability and computational talent, outstanding access to equipment and facilities, a remarkable long-standing engagement – perhaps unmatched even on an international scale – with a large number of industrial partners, and a distinguished record in creating intellectual property and in research commercialization of innovative products.

The background of our group effort in innovation and commercialization - the design and development of pioneering hardware – lies in the many years of successful research and industrial collaboration referenced above. We began by creating and prototyping the first actively shielded MRI coil sets for Cleveland MRI industry in the 1980's. We went on to significant designing, prototyping, patenting, publishing, and graduating of PhD's who have joined the Ohio workforce, most frequently at the dozen or so imaging companies with which we have collaborated over the years. In parallel development, the establishment of a CWRU physics graduate program in entrepreneurship more than ten years ago has benefitted the MIP group in establishing new industry and growing the business workforce. In the past year, MIP has been in various stages of *individual* proposing, planning and collaboration with the following imaging companies (in alphabetical order): AllTech, GE, Hyper Tech, Philips, QED, TMRU, and ViewRay. There have been contacts with additional firms, including the possibility of new and major corporations with interest in Ohio medical imaging investment. This history promises that we understand and can reach the level needed for successful marketing of imaging hardware products, with the necessary firewalls for a large number of industrial partners.

Thus the purpose of the OPTIMISE Proposal is to take the established capability, robust industrial network, and past success of the CWRU Medical Imaging Physics group and stimulate a new level of late-stage development and innovation needs of Ohio companies. The new level would be to turn MIP from individual, smaller scale efforts over longer time periods into a larger scale of multiple commercial partnerships with accelerated time schedules. OPTIMISE would certainly stimulate the collaboration with industry, scale up near-term commercialization which includes growing the business of major Ohio suppliers to the collaborators, and grow MIP to a critical scale to sustain far-term synergism.

The OPTIMISE grant would provide operational funds, equipment, and facility expansion of the extant MIP Platform and uniquely scale the partnership to six or seven or more Ohio for-profit companies. It is proposed that multiple commercial market entries would be accomplished within the IPP time period. It is further proposed that a clear business plan would be created for a self-sustaining IPP with no further OTF investment. The MIP research group's design and development knowledge would thereby be taken to the high level accepted and approved by a new and significantly larger market in which we already have a strong and rich history of achievement.

Please let me know if you have any questions.

Sincerely,

Michael A Martens

Michael A. Martens Ph.D.

IPP 12-285

ALOTERRA ENERGY

3635 Middle Road
Conneaut, OH 44030
866-283-9040
www.aloterraenergy.com

TITLE: Advanced Materials Biomass Fiber Board Project

Aloterra has chosen as one of its initial product lines for our USDA Biomass Crops Assistance Program (BCAP) Project Area in NE Ohio for its new biorefineries, which is a product known as Aloterra Board. Aloterra can produce three different general grades of board: fiber board that is similar to medium density fiber (MDF) board, oriented strand board that is similar to wood based oriented strand board (OSB), and aligned strand board (ASB) which is similar in use and performance to hardwood plywood but provides a unique aesthetic that is unlike most wood type products on the market.

Aloterra has determined that a focus on ASB is optimal because the production process uses existing and proven manufacturing equipment from the wood and bamboo industries and because it focuses on the more resilient high-end market for aesthetically appealing and environmentally sustainable products. High-end goods have proven to fare better in recessions and recover quicker than low end markets. Additionally, there are regions in the US housing market that have either not experienced a decline in prices or are recovering much faster than the US as a whole.

Aloterra's ASB will compete in the domestic $2.5 billion hardwood plywood and $1.7 billion flooring markets. The main competitors will be Kirei Board produced by Kirei USA from sorghum stalks and bamboo produced in Asia. Aloterra ASB will provide a unique aesthetic from both of these products with similar and potentially superior performance. Environmental sustainability of ASB will be similar to Kirei's offering but will be superior to bamboo mainly due to its domestic production and distribution.

Contact:
Scott Coye-Huhn
Senior Vice President, Corporate Development and Chief Legal Officer
Aloterra Energy LLC
2002 Timberloch, Suite 420
The Woodlands, Texas 77380
713-412-5311

IPP 12-286

AVETEC
ACCELERATING AMERICAN INNOVATION

Ohio Department of Developent
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

December 29, 2011

Subject: *2012 IPP LOI*

To Whom it May Concern:

Advanced Virtual Engine Test Cell, Inc. (Avetec), a Not-for-Profit institution, is pleased to submit this letter as a Lead Applicant declaring our intent to submit a proposal to the Ohio Department of Development in response to the Innovation Platform Program.

Avetec Contact Information:
James Mainord
4170 Allium Court
Springfield, OH 45505
jmainord@avetec.org
937-322-5000 ext. 2040

Known Collaborators:
SRI International, Inc.

Anticipated Funding Request:
$3 Million

Technology Areas:
Medical Technology, Advanced Materials, Sensing & Automation Technologies, and Software Applications for Business and Healthcare

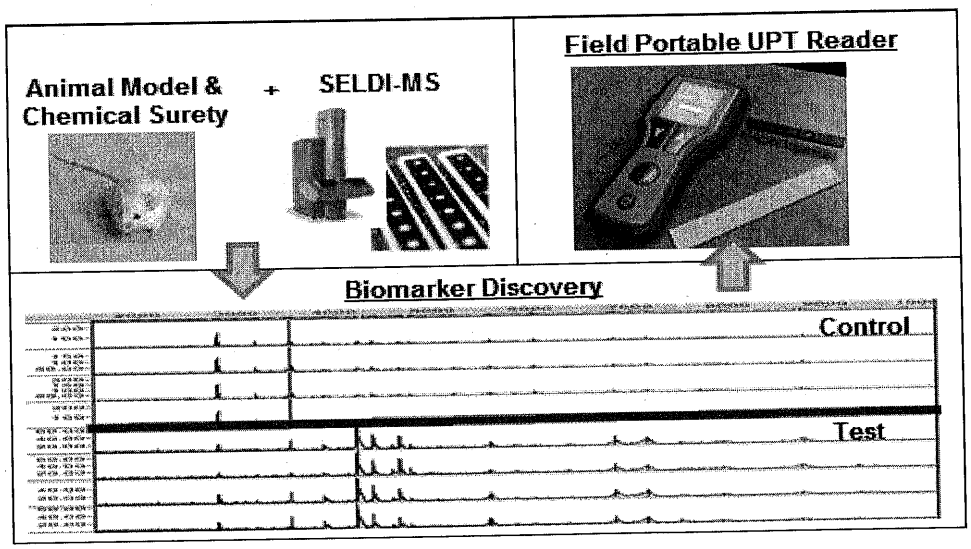
Project Title:
Design, development, and fielding of future Biological Markers (BioMarkers) and assays to enable man-portable, low-cost sensing devices for detection of diseases and exposure to vectors and agents.

Project Summary:
BioMarkers are core to many applications ranging from biomedical to biofuels to forensics and now biosecurity. SRI International is known as a world class BioMarker research and development (R&D) institute. Integrated BioMarker R&D and transition would be powerful, having potential to win major programs at most government agencies and many industrial venues. Avetec and SRI can leverage multiple proprietary assets across multiple business sectors, developed once and applied many times, in conjunction with and for transition to other entities in the State of Ohio. Funding would help access the increased funding levels in BioMarkers and portable assays in federal and commercial markets. Market trends suggest this field will continue to expand, with increased federal and industry funding opportunities.

This program will help identify, select, and validate new genetic, protein, or other BioMarkers necessary to design, develop, and field accurate assays and MEMs-based devices to enable man-portable, low-cost sensing of diseases and exposure to vectors and agents including:

- Infectious diseases – proteases, natural products, cytokines, etc.
- Behavioral BioMarkers - quantitative EEG, etc.
- Exposure to chemicals, radiation, etc.
- PK /PD in BioMmarker development and LC MS in BioMarker discovery
- Design, development & validation of new safety biomarkers – renal, hepatic, CV, skeletal

Avetec and SRI will implement new BioMarkers using a simple lateral flow assay for field use. We propose to integrate existing upconverting phosphor technology (UPT) with BioMarkers indicative of diseases or exposure focused on the discovery of BioMarkers indicative of high mortality diseases, chemical exposure, etc. using an animal model followed by genomic and/ or proteomic BioMarker discovery using SELDI-MS. SRI has developed processes, protocols, and instrumentation for protein biomarkers for discovery for other government clients. We will leverage this ability to find markers and transition the biomarkers to a lateral flow strip using a UPT reader. These new technologies will rapidly transform discoveries into validated, trusted high-value end products and services.



Benefits include a field-portable, low-cost device that provides a rapid method for detection of BioMarkers for specific diseases and exposures reducing time to detect and treat as well as potential pandemic or contamination avoidance.

Thank you for your consideration.

James Mainord
Avetec In-House Counsel

IPP 12-287

Cleveland Clinic

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
IPP2012@development.ohio.gov

29 Dec. 2011

Subject: 2012 IPP LOI

Lead Applicant's Name: Cleveland Clinic

Address: 9500 Euclid Ave, GCIC-10, Cleveland, OH 44195

Phone Number: 216-445-1594

Contact Person: Joseph Rich

Email Address for Contact Person: richj2@ccf.org

Proposed Project Title: Integrated Patient Personal Care Center (IPPCC)

Estimated State Funds to be requested: $3,000,000

Known Collaborators: Zin Medical, Inc., Zin Technologies, Inc.

Summary of Project:

With the federal government mandate for health systems to transition to Electronic Medical Records (EMRs), a great opportunity exists to provide healthcare providers real-time access to patient data and increase the quality of home health care options, while reducing hospital stay time and associated costs. Cleveland Clinic has been a pioneer in the EMT. To greatly enhance these offerings, a close collaboration is needed with technical experts to assist with software and technology development and medical experts. Establishing and nurturing these collaborations will allow Ohio to continue to be a leader in advancing the healthcare industry, while bringing jobs to our state.

The goal of establishing the Integrated Patient Personal Care Center (IPPCC) is to build on our ongoing work to enhance and formalize the interaction between scientists, clinicians and industry partners. An important part of this collaboration will be to provide convenient, efficient and reliable remote monitoring services for the care of chronically managed patients, as well as advancing software to allow the healthcare provider to maintain seamless care in a remote setting. The IPPCC will be the leader in providing two-way communication with patients, allowing healthcare providers to monitor and manage ill patients on an immediate basis at any time of the day or night. The communication and patient management aspects will set this technology apart from others that just provide monitoring data. The IPPCC will provide and coordinate ongoing research and development efforts at Cleveland Clinic with local companies focused on commercializing these products into the market, establishing northeast Ohio as the international leader in this important and emerging industry.

IPP 12-288

WRIGHT STATE UNIVERSITY

Center for Nano-Scale Multifunctional Materials
College of Engineering & Computer Science
3640 Colonel Glenn Hwy.
Dayton, OH 45435-0001
(937) 775-5040
FAX (937) 775-5082

Dr. Sharmila M. Mukhopadhyay, Director
smukhopa@wright.edu

Date: December 29, 2011

To: The Ohio Department of Development

Re: Letter of Intent for 2012 IPP Project

I hereby submit this Letter of Intent for the 2012 competition for the Ohio Third Frontier Innovation Platform Program. Programmatic information of the intended proposal is provided as follows:

Lead Applicant:	Wright State University
Technical Contact:	Sharmila M. Mukhopadhyay Director, Center for Nanoscale Multifunctional Materials Professor Mechanical & Materials Engineering Tel: (937) 775-5092 Fax: (937) 775-5082 Email: smukopa@wright.edu
Project Title:	Clean Water Innovation Platform
Requested Grant Funds:	$1,000,000 (current estimate)

Project Summary:

The goal of this collaborative project will be to develop and launch advanced materials suitable for sensing and removing contaminants from water. The plan is to introduce products that can make it easier for water management facilities to provide cleaner water at reduced cost. It is expected that collaborative use of infrastructure at the university will be beneficial for all partners: commercial companies will have access to high-tech laboratory facilities as well as cutting-edge research results; academic and federal laboratories will have the opportunity to transfer their young technologies into commercial, military, and dual-use products.

I will be happy to address any questions or comments regarding this proposal.

Sincerely,

Sharmila M. Mukhopadhyay, Professor